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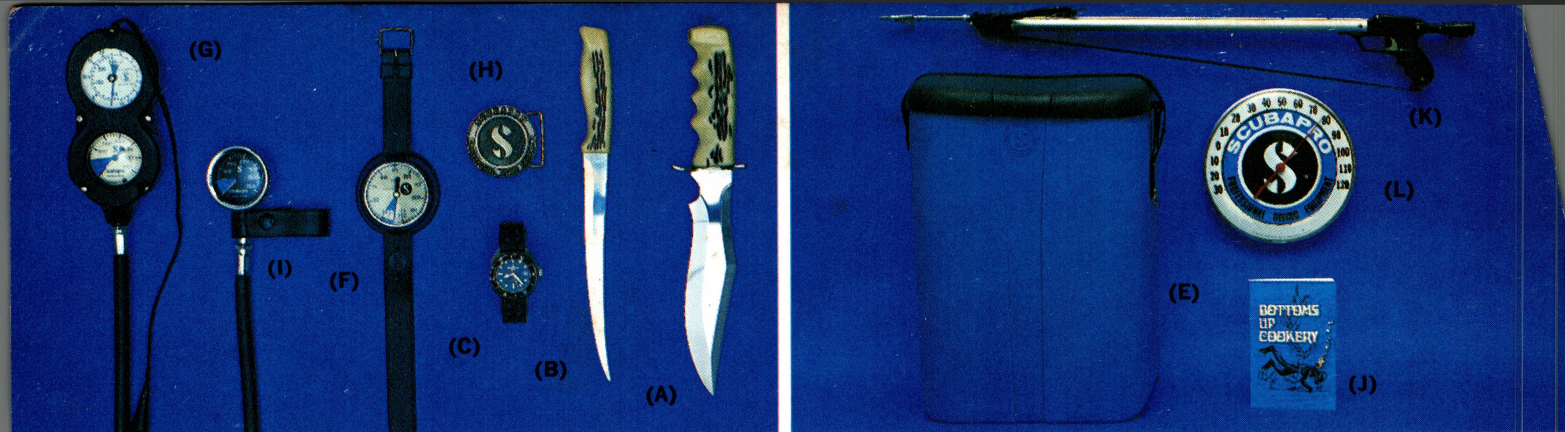
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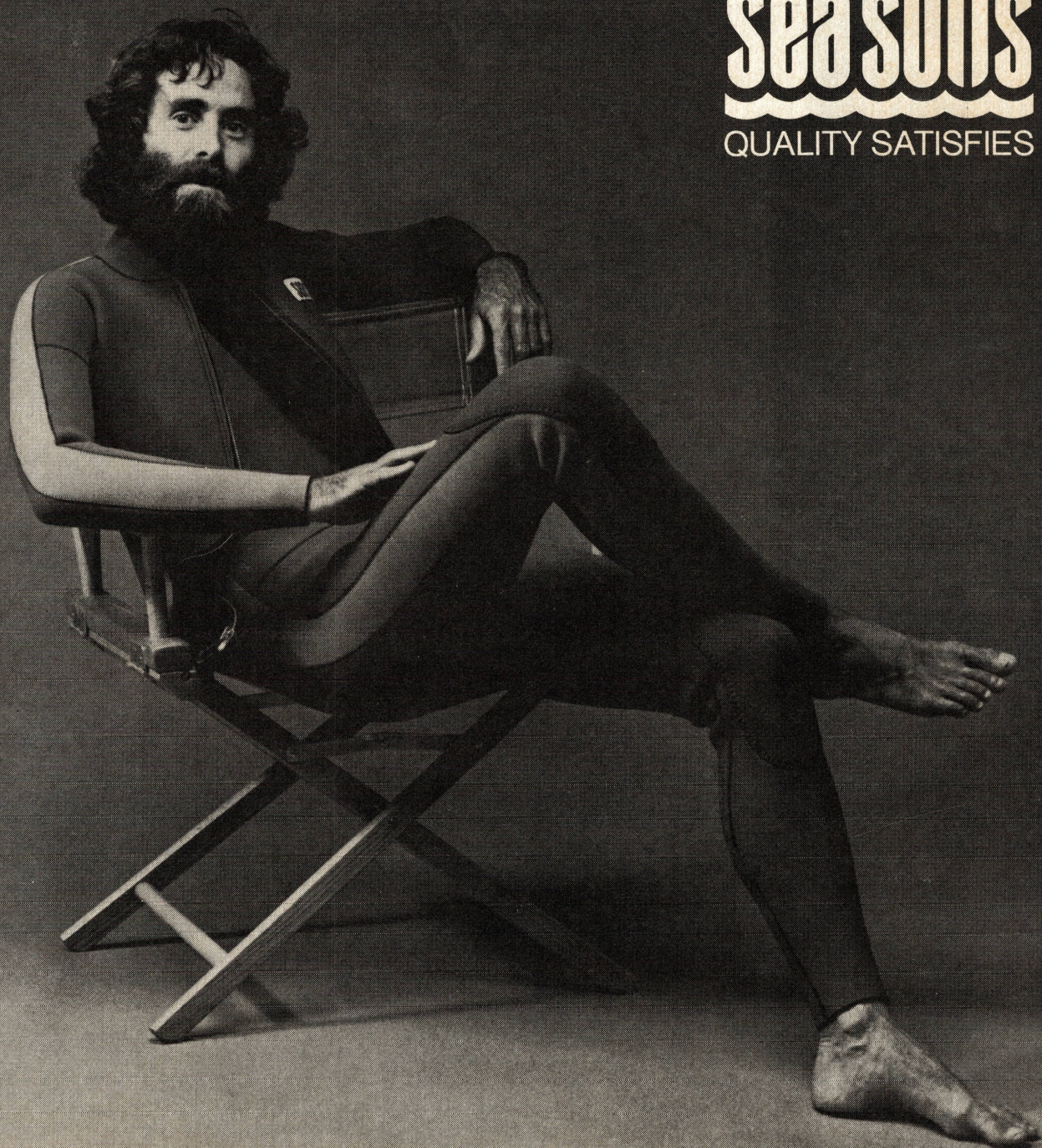
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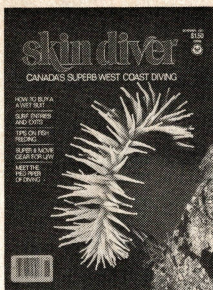
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# skin diver

Volume Twenty-Six Number Eleven

## COVER

This Tealia anemone was photographed at Barkley Sound on the west coast of Vancouver Island, B.C., by Lou Lehmann, using a Nikon F with a 55mm Micro Nikkor lens and a Honeywell 710 strobe, both in Oceanic housings. For more information on Vancouver diving, please turn to our article on page 70.

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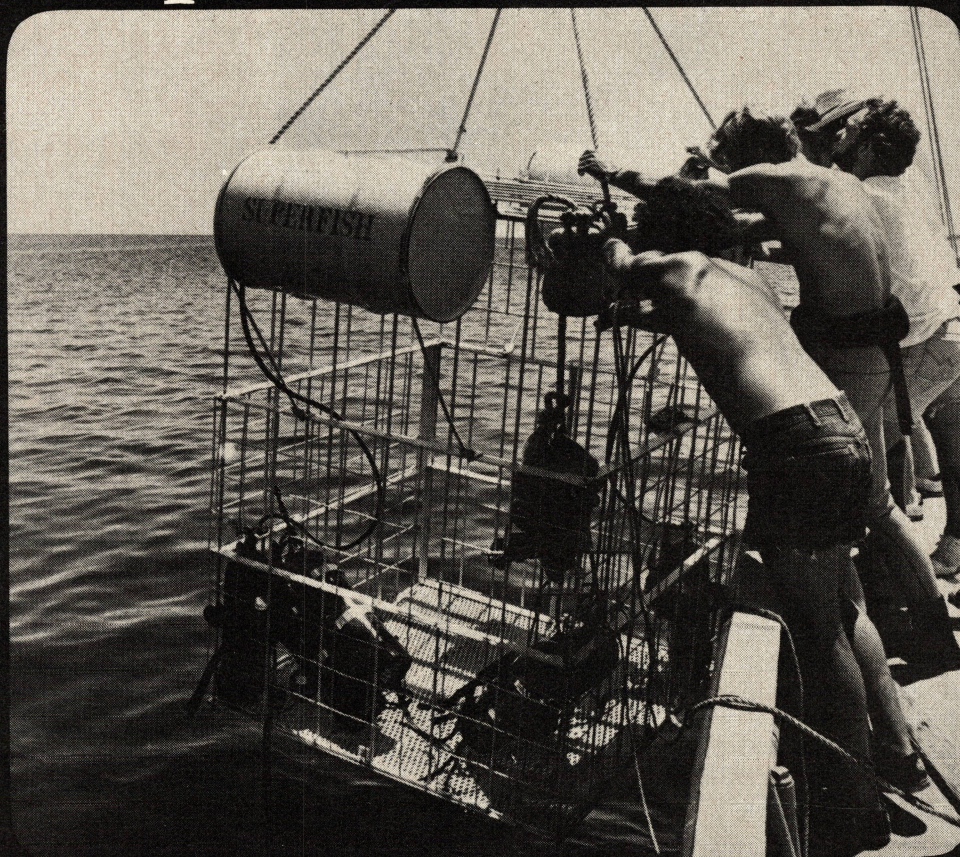
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# Editorial



## INSTRUCTOR INSENSITIVITY BY THE PUBLISHER

Some instructors may not like what I'm going to say but it needs to be said. Many may be shocked by what they are about to read and may even find it difficult to believe.

Let me preface this editorial by clearly stating that half of all the active instructors in the U.S. are doing an excellent job. These men and women are devoted to the sport, conscientious in their training technique and considerate of their students' needs and comfort. We must applaud their work and dedication. Unfortunately, not all instructors fit into this group.

An estimated 30 percent of today's instructors *think* they are doing a good job, but they often make a student's training a difficult or boring experience. These instructors are so gung-ho about diving, they don't realize that not all people are willing to endure the hardships or make the personal sacrifices necessary to keep up with their superman instructor. These instructors are often described as super-machos or gorilla divers. Although it may not be intentional, the macho instructor often subjects his students to unnecessary hardships which then result in a complete turn-off to the sport of diving.

But, it is the remaining 20 percent of instructors who really concern us. They just don't care: Don't care about doing a good job, don't care about their students' comfort, and don't care if their students are really learning what they should. Their reasons are as varied as their excuses. They are overworked, underpaid, burned out, rushed, bored, poorly-trained or overloaded. Whatever the reason, these instructors must clean

up their act or get out of the business of scuba training.

Instructor insensitivity toward students has been a problem ever since diving began, but in recent years the situation has grown entirely out of proportion. Insensitivity is no longer an adequate description. Some of the present day situations border on student mistreatment, or worse. Let's look at a few typical things that happen almost every weekend somewhere in the United States.

A California instructor assembles his class of students on the beach for their first open-water training session in skin diving. The pupils have never worn a wet suit, nor have they been in the ocean prior to this session. They are told to get fully dressed in their one-quarter inch rental wet suits, complete with booties and hood. Then, the entire group is made to stand on a hot sand beach under the broiling sun for two and one-half hours while the instructor gives an entire lecture on surf entries. In addition to the dull and monotonous speech, the instructor wastes time organizing buddy teams, demonstrating equipment and waiting for late arrivals. Meanwhile, the sun beats down on the black wet suits and the students cook in their own sweat. Temperature inside the wet suits has climbed to 130 degrees — about the same as a steam bath. Toward the end of the lecture, one girl passes out from the heat but the instructor still doesn't take the hint. He just mutters something about, "I didn't think she would be able to take it."

A Midwest scuba class shuffles into the swimming pool area for its first night

of skin diving training. The students are dressed in nothing more than swim suits. None have been advised of what the water temperature is going to be. Wet suits are not provided nor were the students told that one would be needed. The instructor waltzes in and immediately orders the class to jump into the shallow end of the pool. The students are mortified to find that the water temperature is a frigid 68 degrees. They are required to spend one and one-half hours swimming or standing in this icy water while the instructor drones on with his lecture, equipment demo and not-so-funny jokes. The instructor never goes into the pool but instead lectures from the deck while remaining snugly comfortable in his terry-cloth-lined warm-up jacket. Meanwhile, the students try their best to listen to what is being said while their teeth chatter and their hands tremble with involuntary shivering. By the following pool training session, there are 30 percent fewer students.

An East Coast scuba class climbs aboard a large charter boat at dawn for its first open-water boat dive. Most of the students are from inland towns and lack any boat experience whatsoever. This will be their first ocean dive. The instructor provides no seasick pills, nor has he warned his students to bring them along. It turns out to be a fairly rough day and the boat pitches and rolls during its two-hour sail to a distant shipwreck. By this time, half the class is deathly ill with seasickness, and the remaining half are not too sure they're going to make it. Does the instructor

(continued on page 6)





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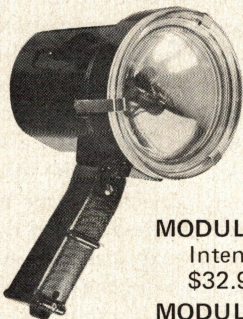
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# Editorial

(continued from page 4)

turn the boat around and head back in? No way! The dive boat sails on and the instructor remains oblivious to the misery of his class. Instead of stopping at a closer wreck location, the boat chugs on for an extra hour to a more distant wreck. Why? Because that is the one the *instructor* wants to dive that day.

These case histories are but a few of the common practices which exist in scuba training today. For some obtuse reason, these instructors actually believe their students must endure a certain degree of pain and discomfort in order to become real divers. In truth, such practices represent an incredible exhibition of poor training technique and class mismanagement.

We are not suggesting that scuba students should be pampered or coddled by the instructor, but it is a well-known fact that unnecessary student discomfort can result in ineffective training.

The instructor/student relationship is very much like a transmitter/receiver situation in the radio business. Just because the instructor is saying the words does not mean that the students fully comprehend the meaning. When a person is too hot, too cold, seasick, or exhausted, he is usually distracted from what the instructor is attempting to teach. Students subjected to these hardship situations are merely going through the motions of learning.

Who's to blame for the problem which exists today? Naturally, an insensitive instructor is at fault, but not entirely. It is the *system* which concerns us. Who is checking on the instructor to make sure he is doing his job correctly? Nobody!

The dive shop owner rarely attends training classes he promotes. He figures the instructor is certified and therefore capable and responsible. The instructor association which certified the teacher has little or no knowledge of the man's training technique. The instructor was simply tested and certified — and then sent out into the field to teach the way he wanted. Since none of the certifying agencies have any monitors or inspectors traveling in the field, there is no way to check up on an instructor's teaching procedures. The students themselves are poor judges of the situation since they have no knowledge of how a class should be taught and therefore no way to make a comparison.

(continued on page 15)

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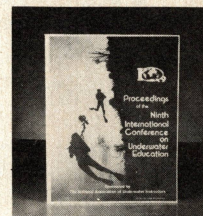
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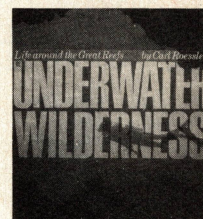
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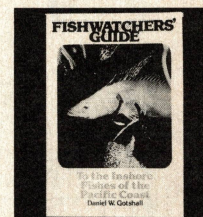
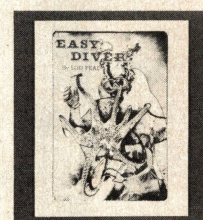
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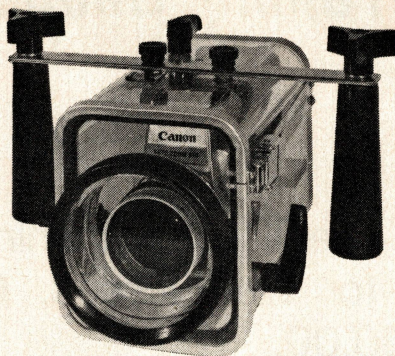
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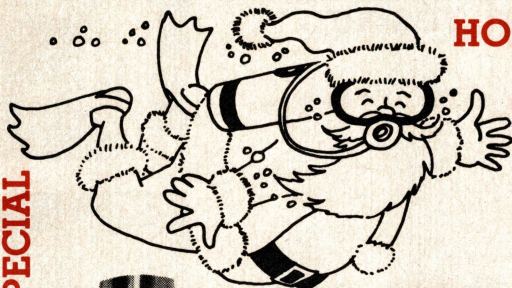
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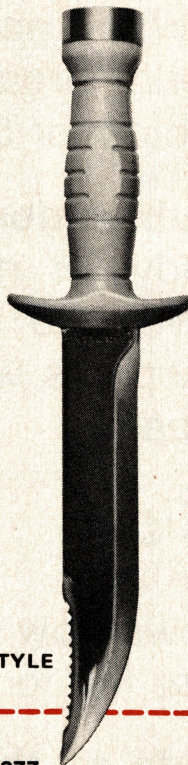


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# CHOOSING & USING

A warm diver is a comfortable diver . . . is a safe diver . . . and for most of us that means a warm wet suit. The wet suit is the single most important equipment purchase and may be the most costly. This garment retards heat loss in cold water and provides some protection from rocks, boat ladders and coral. In addition to protection, it also provides flotation. The selection of your neoprene cocoon is more difficult than selecting fins, BC or even a regulator because there are so many choices to make: type of neoprene, thickness, off the rack or custom made, nylon I or nylon II, hood attached or separate, zippers or no zippers, high waist pants, high waist with a vest, or farmer john's, spine pads, knee pads, elbow pads, knife pocket, key pocket, regular pocket, velcro beaver tail fastener or metal, and now colors. The whole process can become overwhelming, if you let it. Let's take a look at various items and considerations which may help make your selection easier.

The first rule in purchasing a wet suit is: Buy the *best* suit you can afford to fit the needs of how and where you dive. This rule doesn't mean that you have to buy the most expensive suit around, only that what you buy fits you and your type of diving. For example, shore diving places more strain, wear and tear on a wet suit than does diving from a boat. Therefore, if you do most of your diving from the shore you will have to have more suit protection, such as knee pads, nylon outside, or both. A little thought about your needs before you run out to buy a suit can reduce the chances of not being satisfied with your ultimate selection.

All wet suits are made of neoprene which is supplied by four manufacturers: Kirkhill and Rubatex of the U.S., St. Alban of Great Britain and Turbo (Santo Chemical Co.) of Japan. Of these, one is gas blown (Rubatex) and three are chemically blown (Kirkhill, St. Alban and Turbo). The arguments for and against gas or chemically blown neoprene wax long and learned and highly technical and are too much for this article to go into. However, the basis of the arguments is the uniformity of the bubbles. Manufacturers of gas blown neoprene argue that their bubbles are more uniform and thus do not absorb as much water or compress as much as the chemically blown neoprenes. While the logic may be on the side of gas blown neoprene, I have been unable to find a test which states that one production method is warmer than the other.

Wet suit warmth is directly related to how the suit fits and the thickness of the material. Neoprene is available in various thicknesses from one-eighth inch to one-half inch. Therefore, your first consideration has to be the water temperature in the areas where you will be doing most of your diving. Talk with dive shop personnel and other divers to see what they are using and if they are warm in what they selected. They can also give you a good idea of the water temperatures in those areas. For a starting point, use the table on the next page as a rough guide.

*Bill Wilson of the California Wreck  
Divers takes SKIN DIVER  
Magazine on a wet suit shopping spree.*



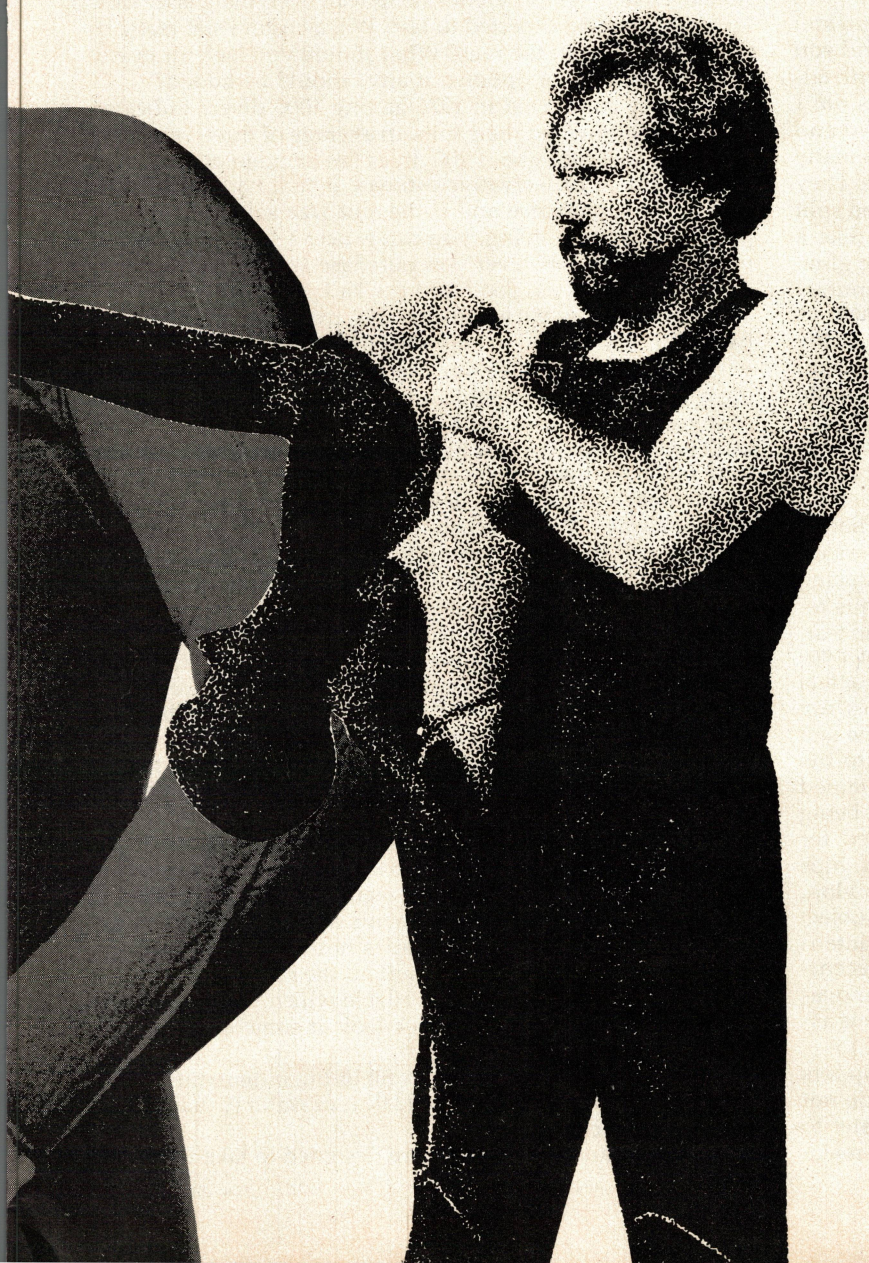


# GOING A WET SUIT

BY BILL TUBBS

## WHAT TO LOOK FOR IN SELECTING COLD WATER WEAR

*Whether you buy a suit off the rack or have one made, there are many factors you should consider before making a selection. The first rule is: Buy the best suit you can afford to fit the needs of how and where you dive. A custom suit will generally fit better than one off the rack when careful measurements are taken at the dive shop. Wet suit warmth is directly related to how well the suit fits and to the thickness of the material. Warmth is highly critical to a diver's comfort and safety.*



photography by Geri Murphy





## Water Temperature

mid 70's and above .....	none or 1/8 inch
low 70's .....	1/8 inch
60's .....	1/4 or 3/16 inch
50's .....	1/4 or 3/8 inch
40's .....	1/2 inch or dry suit

## Thickness

In addition to this guide, you should consider your own body's needs and suit styles. Let's assume that the guide indicates you will need a one-quarter inch suit. If you are male and overweight you might be able to use a high waist model rather than a farmer john, or a high waist with a one-eighth inch vest under the jacket for more protection around the chest area. A female should seriously consider the farmer john pants or the one-eighth inch vest because females have a lower metabolic rate than males and thus do not generate (or lose) as much body heat as a male. A male without a bit of fat on him will need about the same protection as a female.

The type of diving you do will also indicate how much warmth you will need. Photographers need more warmth than do hunters because photographers tend to move around less than hunters or other divers and thus do not generate heat. Those who dive every day, such as dive guides and commercial divers, find they need more protection because they become more sensitive to local conditions than do occasional divers. Think back to your scuba instructor and I'll bet that he or she wore the farmer john style.

Once you have determined the thickness you need, you should consider the advantages of nylon I (inside or outside) and nylon II. The first suits made did not use nylon, and you can still see an occasional "moss back" diver covered with talcum powder pulling one of these skin-two-side suits on. I have seen a couple of these suits which are 20 years old and still being used. However, they have been repaired so many times that they appear to be more glue than neoprene. They are hard to get on (hence the use of talcum powder) and split easily when they come up against something sharp (like a rock). But it is very easy to repair them with neoprene glue. To help overcome the problem of donning the suit, manufacturers first added zippers at the ankles and wrists. Then, as technology advanced, nylon was bonded to one side of the neoprene which allowed the suit to slip over the skin with less effort than bare neoprene. However, the suit still had the splitting and tearing problems. Some divers felt that repairing the suit was more trouble than getting it on so they requested the nylon on the outside. This gave some added protection to the neoprene and because the nylon took the stress the suit did not split like the skin on a sausage when it bounced off a rock. In short, the suit wore longer and less repairs were needed. Manufacturers soon began producing suits with nylon bonded to both sides (nylon II) and thus reduced the effort needed to get the suit on and the wear and tear.

The addition of nylon created some fit problems. Skin-two-sides was softer and would stretch easily to fit so the actual cut of the suit was not critical. However, nylon does not stretch as well as neoprene and the actual cutting of the suit became more important. Zippers which were added to the skin-two-side suit to make it easier to put on were retained to make a tighter fit at the ankles and wrists while still being easy to don. Most divers liked the zippers and asked for more — now you can find zippers at the wrists, ankles, hips and even "convenience" zippers. But zippers, like nylon, have a price. They increase the cost of the suit and are subject to saltwater corrosion and thus demand attention, maintenance and occasional replacement. Nylon zippers have recently come on the market but it is too soon to tell if that innovation will take care of the maintenance and repair problems associated with the more common metal zippers.

There is a school of thought that maintains that zippers reduce the warmth of a suit. It points out that zippers do not make a watertight closure and therefore allow cold water to come in direct contact with the body. This school also main-

tains that the one-eighth inch neoprene backing isn't enough to stop the flow. The argument appears to be more intellectual than actual. So long as the neoprene flap is positioned properly each time, there should not be any noticeable difference in warmth. (Note Understanding Heat Loss In Divers, SKIN DIVER, October, 1976.)

The fit of the suit is your next consideration. There are some divers who can walk into a shop, try on a suit off the rack, and walk out with a perfect fit. Not all of us are that lucky. A suit should fit snugly everywhere but not be so tight that it restricts breathing or your circulation. The best way to judge the fit of any suit is experience and this can best be obtained by going to many dive shops and trying on as many suits as possible. By trying on several different manufacturers' products you may find a stock suit which is just right. Even if you elect to have a custom suit, the process of trying on suits will allow you the opportunity to ask questions of shop personnel. These people are usually divers, too, and can give you tips about maintenance and care which you might not find out any other way. It follows that the more suits you try on, the more shops you can visit, the more data you can collect. And with more data the odds are that you will be more pleased with your final selection.

If, after trying several shops and several suits, you can't find a suit that you like or one that fits well, you have two options: 1) buy a suit that isn't quite what you want but will work or 2) have your suit custom made. At this point economics have to be considered along with everything else. How long can a suit be expected to last? Will a custom suit really be better than one off the rack? What should you look for in suit construction? What options, if any, should be added?

A survey conducted in 1976 among 1000 divers indicated that they had owned their suits an average of three years and had used them for about 200 dives (an average of two dives per month). A conservative estimate is that with reasonable care and maintenance and if the suit was selected for your particular type of diving, you can expect a suit to last five or more years. So whatever you purchase will be with you for some time, both the good and the bad.

Wet suit prices vary considerably from around \$50 for a basic suit off the rack, to over \$400 for a deluxe custom model with everything on it. Taking these two extremes and assuming a three-year average life and 100 dives, the \$50 suit will cost you 50¢ per dive vs. \$4 per dive for the deluxe. What can't be factored in is how happy you'll be with each one, and how much that happiness or unhappiness is worth to you.

A custom suit usually will fit better than one off the rack — but not always. When a custom suit doesn't fit the cause can be attributed to one or more of three things: 1) the manufacturer blew it, 2) you aren't wearing the suit correctly, or 3) poor initial measurements were taken at the dive shop. If the suit doesn't fit, take it back to the shop — put it on and point out where you feel the fit isn't right. At this point the shop people can tell if the suit is cut wrong or if you are wearing it wrong. In either case it can be corrected. If the problem is due to poor measurements taken at the shop, your problem is a little more difficult. About the only thing you can do is put the suit on and have a friend take several photographs. On the photographs you should mark the spots where you feel the fit is not right and send the photographs to the manufacturer and let him tell you what to do next. These confusions in measurement arise because different manufacturers have slightly different measurement requirements and you may have ordered a suit which the dive shop is not too familiar with.

Whether you purchase your suit off the rack or have it custom made, there are options available which you might consider adding to the suit. A quick look at some of them may help you decide what to do.

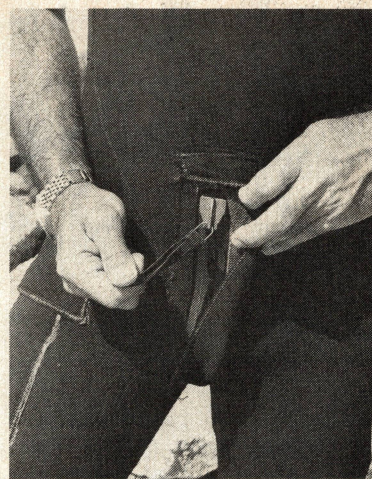
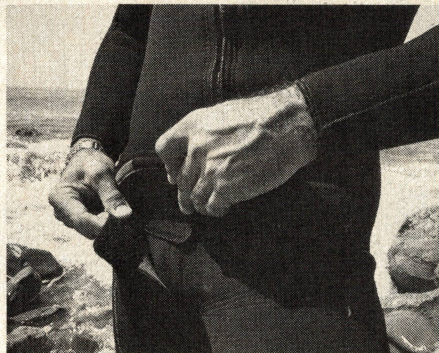
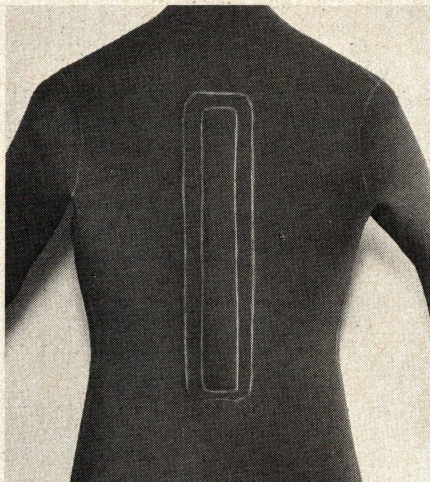
Spine Pad: this is designed to fill in the indentation along the spinal column and restrict the flow of water (usually cold) down your back.

Knee Pads and Elbow Pads: are designed to take wear and

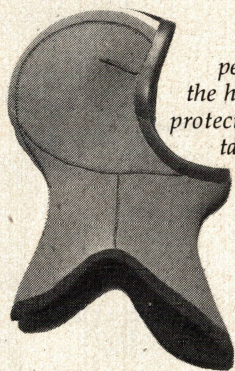
(continued on page 24)



The spine pad (below) is designed to fill in the indentation along the spinal column, thus restricting the flow of water (usually cold) down your back.



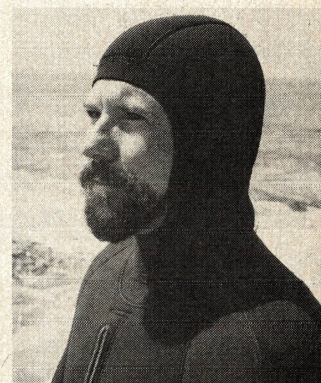
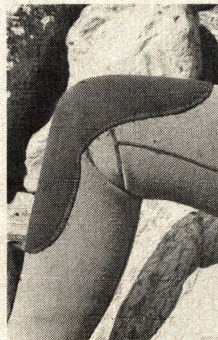
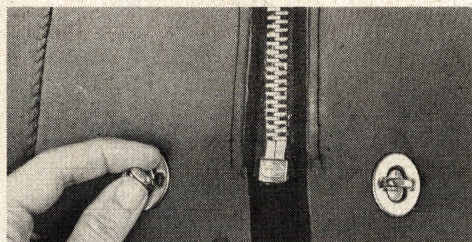
Velcro fasteners (above left), used to close the beavertail, are quick and simple to use. They also eliminate the metal fasteners which can break and corrode. Velcro fasteners on wrist cuffs allow you to adjust the tightness of the sleeve. For an additional cost, some manufacturers will install a "relief zipper" (above right), eliminating the need to remove the suit when "nature calls."



The body loses a great percentage of heat through the head, feet, and hands. Head protection is especially important and cold water divers should wear a hood (left).



A quarter-inch farmer john (left) provides added warmth to the body's vital organs. Coveralls (below) protect wreck diver Bill Wilson's suit from sharp objects.



Swivel fasteners (top), or "twist locks," on the beavertail require more maintenance than velcro fasteners. Rinse them in fresh water to avoid corrosion. Seam tape (above left), to protect seams that have been stitched and reduce leakage, is sometimes added to seam lines. Knee pads (above right) protect the suit from excess wear and substantially extend the life of the suit. Knee pads are especially helpful to photographers and shore divers.

A utility pocket (left) aids in tucking away extra tools and accessories. An attached hood (above) prevents water from entering the neck area and flowing down the chest and back. This jacket is the warmest.



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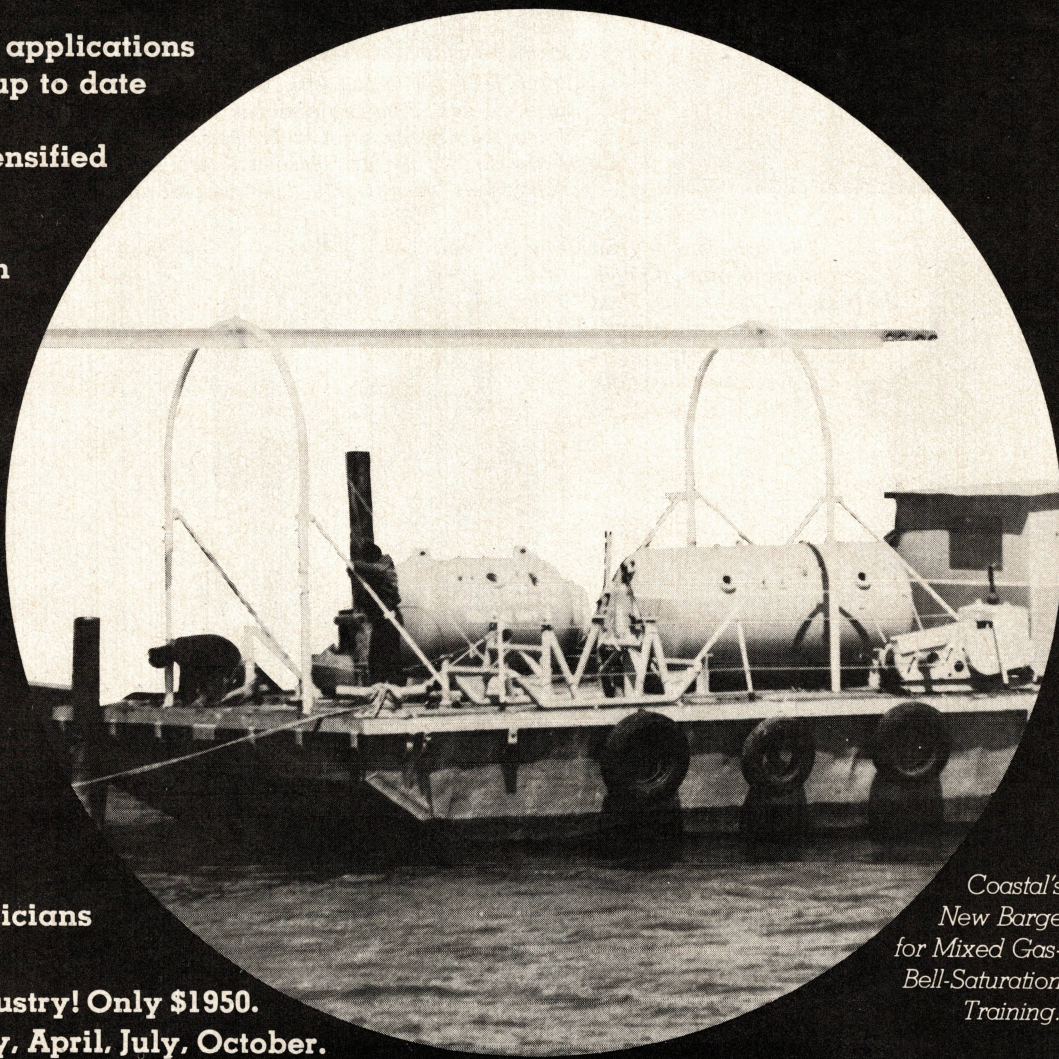
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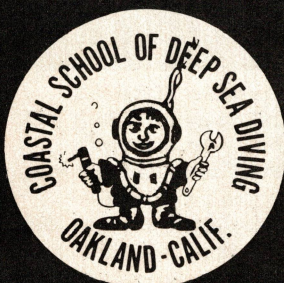
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# Editorial

(continued from page 6)

Who is affected by this situation? Frankly, the entire sport of diving suffers badly from the effects of this small percentage of careless instructors. We are all affected — the dive shops, the good instructors, the instructor associations, the poorly-trained students and experienced, well-trained divers.

First, let's look at the victims of these poorly-managed scuba classes. Some of the students drop out during training and become completely turned off from diving. This represents a loss to both the sport and the industry. It is one more person who thinks sport diving is dumb, difficult or cruel. Those that make it through the entire class may not be as well trained as they should. Some may have dive accidents afterwards, and these same accidents could possibly affect our well-trained divers.

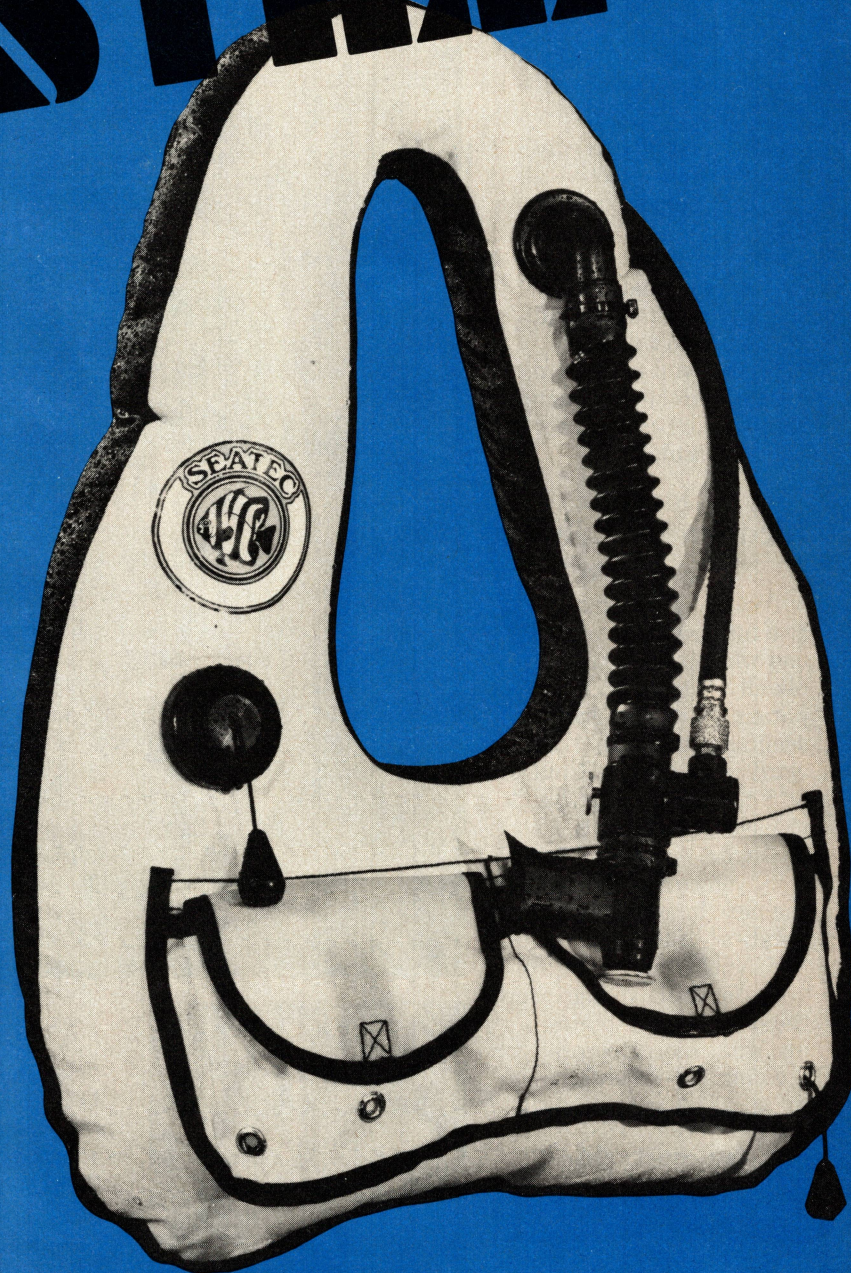
The dive shop suffers almost as much as the students. Those who drop out represent lost sales in equipment, trips and future activities. If the class is really bad, it can even degrade the reputation of the shop and cause customers to go elsewhere. The instructor association also suffers because it is indirectly responsible for the poor performance of the problem instructor. Since he carries the symbol of their certification brand, his mistakes become the association's mistakes — like it or not. One bum instructor in an area can really make it tough for all the other instructors of the same certification who are trying desperately to do a good job. And, in the long run, the sport of diving also suffers as newspapers, legislatures and insurance companies become evermore critical of the actions of that small segment of poor instructors.

If sport diving is to have a future, we must find a way to change and improve the system. There must be a check and balance method for ensuring good training and good scuba class management. This sport can no longer tolerate, nor condone, the irresponsible actions and sloppy teaching methods of a few uncaring, insensitive instructors. >>>



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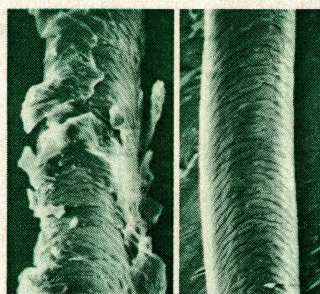
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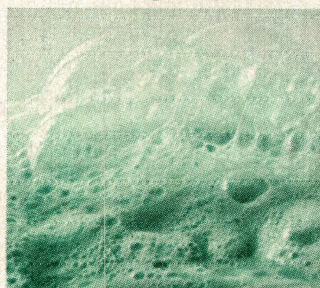
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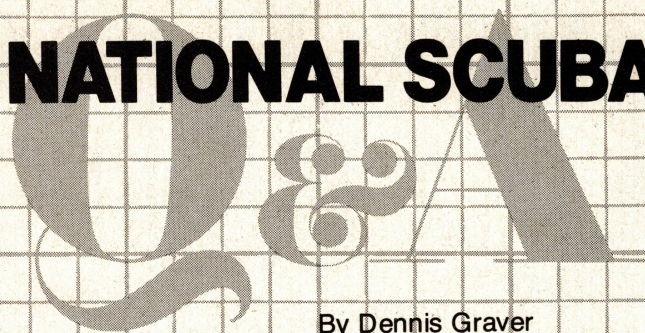
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# SDM'S NATIONAL SCUBA EXAM



By Dennis Graver

## Category: Cold Water Diving

Loss of body heat in water can create serious problems for the diver, as water robs a person of heat many times faster than will air of the same temperature. Test your understanding of the effects of heat loss by answering the following questions. Answers are on the following page.

1

Hypothermia means a lower than normal:

- ☐ A. Total body temperature
- ☐ B. Body core temperature
- ☐ C. Body extremity temperature
- ☐ D. Body skin temperature

2

A thermally unprotected diver will become chilled unless active in water as warm as:

- ☐ A. 70° F
- ☐ B. 75° F
- ☐ C. 80° F
- ☐ D. 85° F

3

Without good thermal protection in icy water, about half of the heat loss of a diver takes place through the:

- ☐ A. Head
- ☐ B. Arms
- ☐ C. Legs
- ☐ D. Chest

4

Vigorous exercise underwater to increase body heat production lengthens the time period before hypothermia occurs.

- ☐ A. True
- ☐ B. False

5

The body's reaction to cold is to shunt blood from the extremities, so a diver will lose little heat through the hands in icy water once numbness sets in.

- ☐ A. True
- ☐ B. False

6

The blood shunted from the extremities during coldwater diving increases the blood volume in the trunk. This tends to cause:

- ☐ A. More frequent urination
- ☐ B. Thicker blood
- ☐ C. Both A and B
- ☐ D. Neither A or B

7

If you have been shivering uncontrollably underwater for quite awhile, then stop shivering and don't feel as cold, it indicates that:

- ☐ A. You have adapted to the water temperature
- ☐ B. Your shivering has produced enough heat to offset the cold
- ☐ C. You are not physically capable of diving in cold water
- ☐ D. You are experiencing symptoms of hypothermia

8

Arrange the answer letters in sequence for the first aid for hypothermia ranging from the least severe symptoms to the most severe:

- ☐ A. Immerse the victim in a hot bath
- ☐ B. Remove wet suit, dry off, don warm clothes
- ☐ C. Have victim exercise and drink warm drinks
- ☐ D. Get victim dry, warm with external heat source

9

Which of the following are early symptoms of hypothermia:

- ☐ A. Loss of tactile sense
- ☐ B. Increased muscle tension
- ☐ C. Muscle cramping
- ☐ D. All of the above

10

Many people who dive in cold water regularly develop the ability to safely tolerate the cold for longer periods of time than they could initially with no change in equipment or conditions.

- ☐ A. True
- ☐ B. False

11

Alcohol (or hangover), smoking, apprehension, or illness do not contribute substantially to body heat loss in water.

- ☐ A. True
- ☐ B. False

12

Cold causes increased respiration, which results in more heat loss and increased air consumption.

- ☐ A. True
- ☐ B. False

13

If a current is present when diving in cold water, it is advisable to:

- ☐ A. Dive with the current
- ☐ B. Dive perpendicular to the current
- ☐ C. Dive against the current



# SDM'S NATIONAL SCUBA EXAM

1

**B. Body core temperature.** The deep tissues in the body must maintain a temperature of at least 97° F. Below this temperature physiological malfunctions begin to occur.

2

**D. 85° F.** Water has a capacity for heat 1000 times greater than air; therefore, even seemingly warm water can drain heat from a diver faster than it can be produced.

3

**A. Head.** One of the body's defenses to cold is to shunt blood from the extremities — all except the head. The brain is poorly insulated and is a good conductor, but must receive circulation. Insulate the head as well or better than the rest of your body.

4

**B. False.** Exercise increases circulation to the extremities, which results in a greater heat loss. In water colder than 60° F, more heat is lost when exercising than would be lost if motionless.

5

**B. False.** Circulation will be restricted to hands and feet to prevent heat loss until the skin temperature reaches 55° F, then circulation will be restored until the temperature reaches 85° F! A great amount of heat will be lost when this occurs. Insulate the hands and feet to preserve body heat.

6

**Both A and B.** Increased blood in the trunk is reduced in volume by removal of fluid. This can cause several problems and contribute to decompression sickness. Drink lots of fluids between dives to replace those lost from the blood.

7

**D. You are experiencing symptoms of hypothermia.** In fact, this is a severe symptom. Get out of the water when sporadic shivering cannot be suppressed by voluntary movement. When shivering is uncontrollable, you are close to a serious situation.

8

- C.** Have victim exercise and drink warm drinks
- B.** Remove wet suit, dry off, don warm clothes
- D.** Get victim dry, warm with external heat source
- A.** Immerse the victim in a hot bath

9

**D. All of the above.** Following these symptoms comes shivering, and when shivering occurs in gross bouts, it is time to terminate the dive.

10

**A. True.** Individual susceptibility to cold varies, but nearly all divers can adapt to cold somewhat over a period of time. This adaptation can only take place if a person dives regularly, however.

11

**B. False.** All of these factors affect heat loss significantly. Avoid stimulants, be sure you feel well, and feel confident before diving in cold water. Even apprehension can make you colder by causing you to breathe faster, which results in a greater heat loss through respiration. This, in turn, makes you breathe more, which makes you colder, etc.

12

**A. True.** Cold causes an initial increase in respiration, and from 15 to 24 percent of the body's heat-producing capability can be lost through respiration. As respiration increases due to cold, air starvation can occur even though equipment is functioning properly.

13

**A. Dive with the current.** If the diver and the water move together, the diver will not have cold water forced into the suit as would be the case when opposing the current. It is similar to walking with the wind rather than into it on a cold day. Plan ahead though, so you do not end up down current from your point of exit.

*The effects of body heat loss in water can be serious. Dive with appropriate insulation, know the symptoms of hypothermia, and have the wisdom to quit diving when cold sets in. A new publication on hypothermia is now available from Commercial Diving Center, 272 S. Fries Ave., Wilmington, CA 90744, for those interested in more information on the effects of cold. Next month's exam is on buoyancy.*



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# Underwater Forum



## Dropouts, Why?

I'm glad you picked the topic of dropouts for the editorial in the August issue. I was certified under NAUI three years ago. I felt that I had received adequate training. Because I thought my instructor to be well informed, I recommended him to my girl friend. After her first class lecture, Laura told me that she didn't think she was going to get along with the teacher. So, thinking to myself that a refresher course never hurt anybody, I decided to sit in on her class meetings. To my surprise, I found that [the instructor] fit the same sort of description given by the third paragraph in the editorial.

Either I hadn't noticed when I took the class or this instructor had made a personality change. In lecture he spent half the time on little obsolete details and half on tall stories of dangerous situations he has been in. His pool sessions were useless because nobody knew the reasons behind doing the exercises.

I went out on the checkout dive with the class. I still can't believe it! A number of students didn't even know how to secure the tank into the pack, not to mention how the regulator was supposed to go on. The lecture exam was unrelated to many previously given class lectures. Things they never heard of were asked of them. The instructor told his stories right through the exam, making it almost impossible for students to concentrate. Although low scores were not received by several girls he had been flirting with throughout the course, the majority of the class squeaked by.

What should we do or, rather, how should we deal with such instructors?

D. TURNER

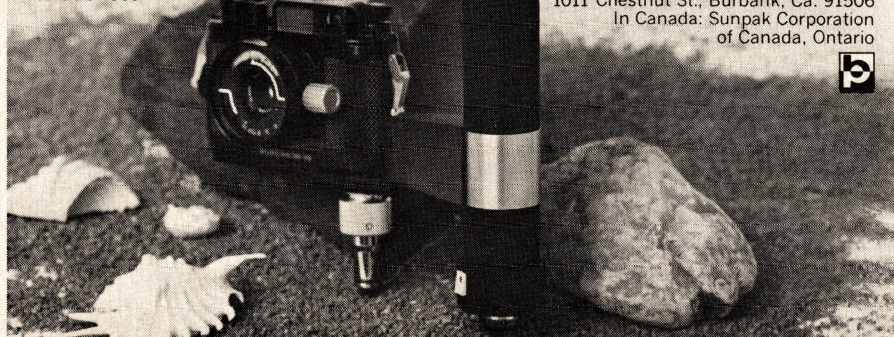
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# PADI

## NUMBER ONE IN DIVER EDUCATION

## Underwater Forum

I would like to compliment you on your invigorating editorial in the August issue of SKIN DIVER. As a diver who has enjoyed the sport from a multiple of angles, ranging from underwater photography to cave diving, I have often wondered why many beginners did not share my enthusiasm. Somewhere in training, the diving dropout must have gotten a less than attractive impression of the sport. I feel that training should be both a key to unlock all the enjoyment diving has to offer and a stepping stone to further training. . . . I feel very strongly against many basic certification courses that are taught with strict . . . make-it-or-break-it tests and super-jock physical fitness standards. After all, isn't diving a "mental sport" for the most part and isn't the job of an instructor to teach and not to eliminate?

HUGH DELOZIER ASHEVILLE, N.C.

### Conn. Lake Diving

. . . Several divers, including myself, recently made a three and one-half hour journey from northwestern Massachusetts to southern Connecticut in order to dive a wrecked WW II plane in Squantz Pond and make a second dive to the remains of a city under Candlewood Lake. Both of these sites were listed in a feature on Connecticut's Lakes (Aug '77).

Upon arriving in the area we contacted the closest dive shop (which, by the way, was not listed in the article) and to our displeasure learned that the plane wreck and remains . . . did not exist . . .

I am sure that, like fishermen, divers have their tall stories, but let's be level-headed enough to sort out the truth from the stories . . . I believe a retraction is in order . . .

C. R. GRZEBIEN AGAWAM, MASS.

I have questions in regard to the August SKIN DIVER. That issue carried an article titled Connecticut Lakes, by Peter Auster. The author, in describing Candlewood Lake, mentioned that there "is an old town underneath its waters" . . . and Squantz Pond [is] reputed to offer . . . "a wreck of an old WW II plane." [At a local dive shop] we were told there is no city under Candlewood Lake and no plane wreck in Squantz Pond.

I thought the days of ghost wrecks and tall tales of deep sea divers finding a skeleton at the wheel and treasure chests in the hold were gone.

R. VANHEYNIGEN, JR.

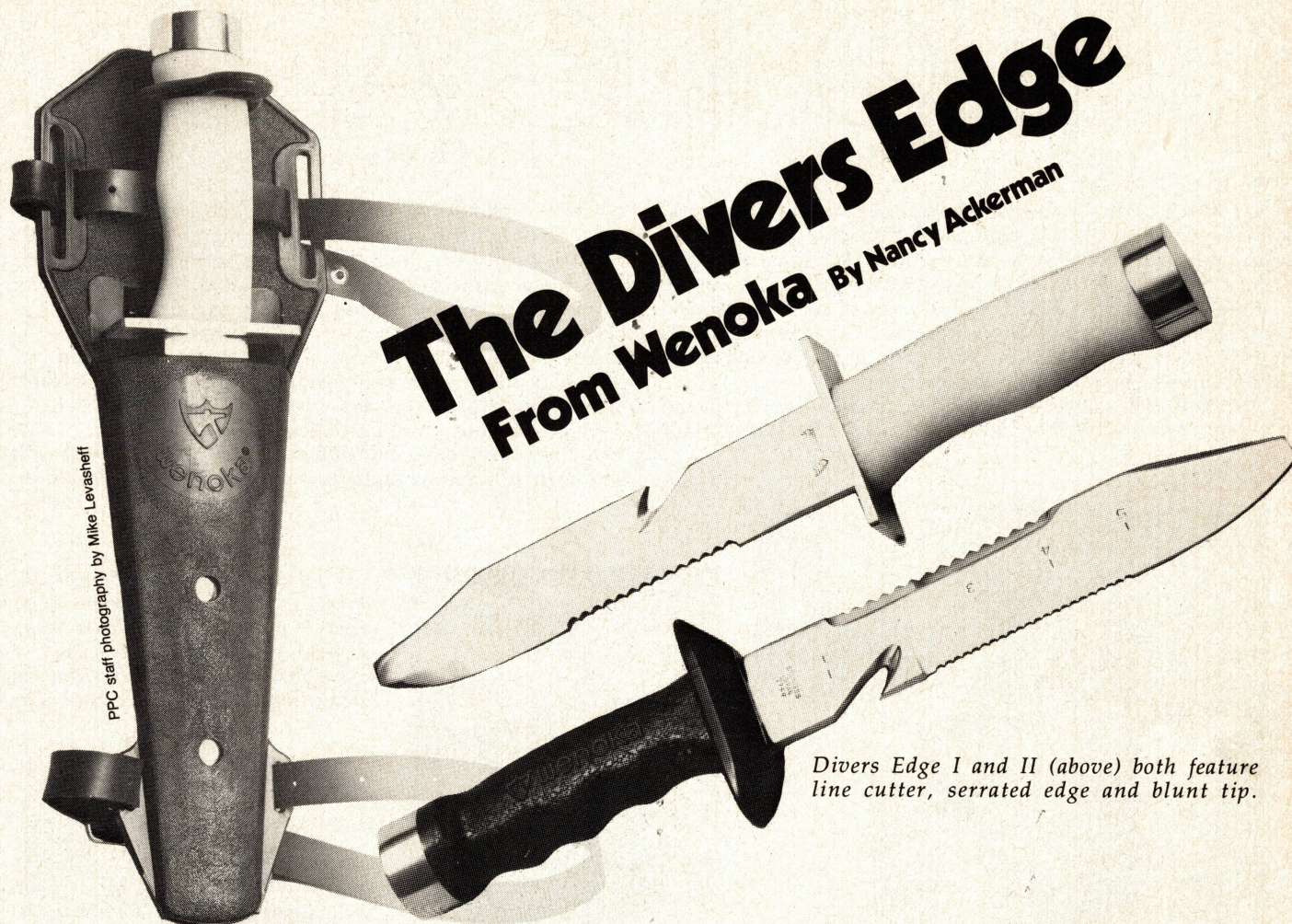
WESTFIELD, MASS.

(continued on page 26)



# The Divers Edge

From Wenoka By Nancy Ackerman



*Divers Edge I and II (above) both feature line cutter, serrated edge and blunt tip.*

**P**erfect shot! That white sea bass is going to weigh in at about 30 pounds. But something's happened: Your speargun's line is tangled. Reach for your knife before you lose your fish . . .

You've descended the wall beyond the reef with your Nikonos and strobe and have shot better than half a roll of film. Looking for your next subject, you realize there are several good-sized scallops in front of you. It would take just a short time to pop them off and resume your photo-dive. Reach for your knife . . .

The waves are timed perfectly. You've made it through the surf with ease and are beginning to kick your way out along the rock jetty. And then you realize you've become entangled in an incredible, intricate mass of filament line left by fishermen. To extricate yourself you reach for your trusty knife . . .

The common denominator in each of these situations is, of course, the diver's knife.

The company currently leading the way in giving divers a wide selection of knives to take into the aquatic world is Wenoka Cutlery. And, concurrent with their attractive assortment, Wenoka is introducing four new models to their line — all tagged The Divers Edge.


These four knives are numbered I through IV. Their blades are made of 400 series, corrosion-resistant stainless steel; the molded handles have heavy butt caps affixed to the tang of the blade, also of stainless steel. Models I and III have their safety guards molded onto the knife blade; Divers Edge II and IV each have a stainless steel guard. All these

Edge II and IV each have a stainless steel guard. All are available with either black, yellow or orange handles.

Styles I and III are exactly the same configuration, the only difference being the length of their blades — Divers Edge I has a 7 inch blade and Divers Edge III has a 6 inch blade. In this respect, models II and IV are the same except that Divers Edge IV's blade comes to a sharp point — instead of having a blunt end like the other three knives. Divers Edge II is also 7 inches long, an inch longer than Divers Edge IV.

Each Divers Edge knife comes with an injection-molded sheath that has two 24 inch straps. The sheaths are resistant to the detrimental effects of saltwater immersion; the strap buckles are touted to be corrosion-resistant.

Wenoka designed these knives after interviewing divers to determine what features they most wanted and needed. In addition to the characteristics already covered — those concerning materials — there is more that Wenoka has included in the Divers Edge knives that allow each blade to perform several functions. Knives I and III have blunt ends to be used as a diver's tool, as well as a line cutter and two serrated edges; Divers Edge II and IV also feature a line cutter (though this time on the top of the blade), and one sawing edge. Model IV is the only knife with a pointed tip.

Besides being the utilitarian devices divers' knives ought to be, the Divers Edge knives are the right price: Models I and II are \$26.50 and III and IV are \$24.50. So don't cut corners waiting for a better deal than Wenoka's latest. The Divers Edge knives can enhance your next dive by sharpening your performance. 



# CHOOSING AND USI

(continued from page 13)

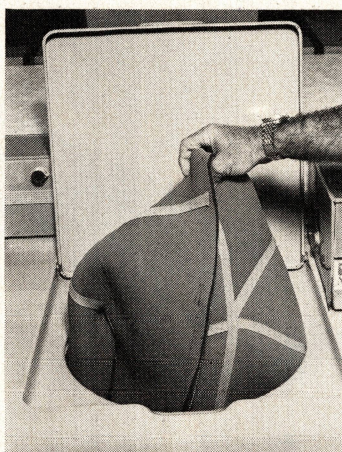
tear which normally would tend to wear out the suit. These are especially good if you are a photographer and kneel on the bottom or brace your elbows on rocks. Knee pads are most beneficial when most of the diving is done from the shore and you have to crawl in over sand, rocks or debris.

**Key Pocket:** usually a velcro attachment inside the jacket. It is a handy place to carry your car keys — again, needed mostly by those who dive from the shore.

**Knife Pocket:** designed to hold your knife (usually in the wrong place). Most that I have seen are partially ripped off

**Color:** available only with nylon II. The addition of color to suits has brightened up the sport considerably and had made it easier to find your buddy. However, some are hard to keep looking nice; this is especially true of white, red and yellow. A Canadian manufacturer has recently come out with a tie-dyed denim look which is very attractive; and if some of the ladies' one-eighth inch tropical suits are any indication, we should soon see some really wild mixtures of colors available in full, cold water wet suits.

While obviously not an option, seams are an area which can create problems, and different manufacturers deal with seams in different ways. Early suits were just glued together.



*Maintenance is the key to wet suit survival. Give your suit a healthy freshwater rinse after a dive or use in a pool. An occasional wash in an automatic washer will also help. A liquid detergent is best.*

*Use a preservative, such as Armor All, (below) on rubber and neoprene equipment to prevent drying. Divers living in large metropolitan areas should be aware that ozone and other pollutants greatly shorten the life of rubber gear.*



within a very short time. If it is positioned on the outside of the thigh, it might be easier to reach, but it is also easier to catch it on something or catch your weight belt on it.

**Velcro Fasteners:** on the beavertail these reduce the effort needed to get it fastened while eliminating some of the metal fasteners which can corrode. On cuffs (wrist) it allows you to adjust the tightness.

**Attached or Separate Hoods:** In theory, an attached hood leaves the jacket with fewer areas for water to leak into the suit and thus is somewhat warmer. In practice, in order for that to be true the hood has to fit snugly around the head and neck. When it does fit snugly it will be slightly more difficult to get the jacket on and off than a jacket with the hood separate.

**High Neck Jacket:** a feature which can be beneficial if the (separate) hood is not a cold-water hood. Cold-water hoods usually have longer skirts which come almost to the mid point of the shoulder, effectively reducing the area where water can enter. Regular hoods do not have as much skirt area and therefore need additional material around the neck area to restrict leakage.

But, stress and strain could cause these seams to separate and, if the gluing wasn't just right, there could be leaks along the seam lines. It was, and is, easy to reglue but it takes time and the suit doesn't look as nice as it did before the regluing (unless you happened to be very skillful). Manufacturers then began to sew the seams in addition to gluing them. This helped to spread the strain and reduced the separation problems. But threads can be cut on rocks or wrecks and with some types of sewing equipment the stitches allowed leakage. To protect the stitches and reduce the leakage some manufacturers added tape along the seam lines. Thus, today you can find all three techniques on the market. As a rule of thumb, the more that is done to a suit, the more it costs.

Some suits have stitching at the wrist, ankle, bottom of the



# NG A WET SUIT

jacket and anywhere else the neoprene was cut. This gives the suit a more finished appearance but does not add to the warmth or durability of the suit itself. What it does show is attention to details which the purchaser can only hope was extended to other operations when the suit was made.

The key to having the same wet suit for three, four, ten or 20 years is the type and amount of maintenance you give it. This doesn't have to be extensive as much as timely. A nick in a nylon I suit which is repaired immediately prevents that nick from becoming a tear which needs a lot of work. Little things can help extend the life of your suit:

1. Rinse it well with a fresh water after a dive.
2. Give zippers special attention to remove salt water and add some sort of lubrication. This will keep corrosion down and make donning the suit easier.
3. If the suit is used in a pool, give it more rinsing time in fresh water than usual. The chlorine used in a pool can

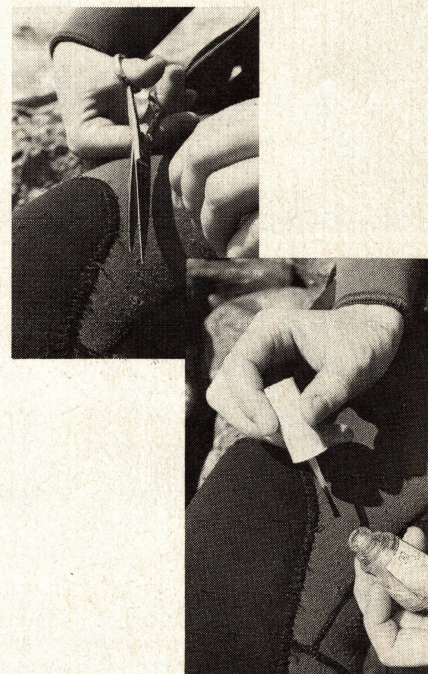
5. Always hang the suit on a wooden or plastic hanger with the pants folded over the cross bar. Packing a suit in the dive bag for long periods can cause the cells along the folds to break down and you will have created a leak and a cold suit. Hanging the suit up prevents anything being placed on top of it which can also cause creases. Hanging also allows air to circulate through the suit which reduces that well-known vulcanized odor.

6. If a thread comes loose do not pull at it. Cut it off and touch up the end with clear fingernail polish.

7. If you live in a large metropolitan area, you should give your suit extra protection. The ambient air with all the pollutants from cars, etc., can cause the neoprene to become dry and decompose. Use some preservative such as Armor All on all your rubber and neoprene equipment to help prevent this drying out process.



*If a thread comes loose on your suit, don't pull it. Cut it off with a pair of scissors and touch up with clear fingernail polish. Examine your suit before and after each dive to detect new nicks or weak spots. A quick repair will prolong the life of the suit.*




*Zippers require special attention. Lubricate jacket, wrist and ankle zippers regularly to keep them running smoothly. Always hang the suit to dry on a wooden or plastic hanger. Packing a suit in your dive bag for long periods can cause unwanted creases.*

cause the bonding of the neoprene and nylon to loosen and soon your suit will delaminate.

4. Wash your suit occasionally in an automatic washing machine (set for warm wash and warm rinse) using a good liquid detergent or soap. Don't use soap flakes unless you like the looks of little globs of white soap all over your suit. Dry the suit in the dryer on a cool or warm (not hot!) setting.

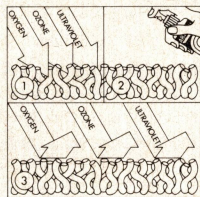
If you really want to extend the life of your suit you might follow in the footsteps of the commercial divers and buy coveralls. Commercial divers use these to protect their dry suits but it should work just as well for a wet suit. Make sure that the coveralls are made of the highest Dacron content you can get. It will absorb less water and wear longer.

In summary, if you stop and think about what you need and how you are going to use it, you will find yourself choosing equipment which is going to make diving more fun. Evaluate your needs and buy the best that you can afford — but don't buy what you do not need. 



# FIGHT ROT.

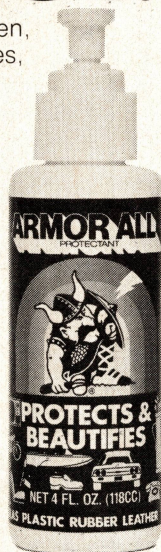
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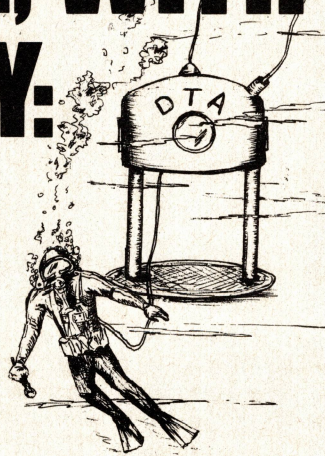


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## Underwater Forum

(continued from page 22)

It was not my intention when I wrote the article to create a hoax or to cause questions about SKIN DIVER'S credibility.

The real facts are these. Candlewood Lake has had many planes crash into it, including planes dating back to the 1940's. All planes that went into the lake were subsequently salvaged. When I consulted with the divers from the area, there was a plane in the lake but this too was salvaged. There still are some remnants of the planes in the lake as divers have found some scattered pieces. The remains of the old town are also in the lake. It is unclear from this gentleman's letter whether he had found the town or not, but it is there. Squantz Pond is also a good dive spot to observe fish and also many interesting plant species.

Also, the dive shops that I listed were those conveniently located near the lakes and not meant to be a list of all shops in the state. The shop the reader refers to, I assume the one on Brookfield, was not in business at the time the article was written.

I am extremely sorry that I caused these divers any inconvenience . . .

PETER AUSTER MIDDLETOWN, CT.

### Airport Ripoff

. . . our luggage was cut open during "checked through" baggage transfer at the Miami Airport and our regulators and other equipment stolen. We transfer through Miami often without any such loss.

However, last month on a return trip from Washington D.C., one of our bags was again cut open at the airport. I was puzzled until I noticed the damaged bag still carried a sticker on the outside exclaiming the adventure of diving the Cayman Islands. The same sticker had been on our bag which was slit open before.

I am now saving all dive stickers to decorate a set of beer glasses.

STAN GREEN KEY WEST, FLA.

### Diver Down

In Texas, we have no regulations concerning the use of the diver's flag. Neither is the diver required to fly the flag, nor are the other water sportsmen required to show respect for a flown diver's flag. A group of concerned divers are trying to remedy this problem, but we need the help of our fellow divers across the nation. If your state has a regulation concerning the use of the diver's flag, would you please forward a copy . . . to us. This is a safety problem both for the scuba diver and the other sportsmen who use the waters of Texas.

L. M. KINNEY  
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# Shell Collector's Notebook



## THE PERTUSA CONE (*Conus pertusus*)

BY E. R. CROSS

Cone shells are some of the aristocrats of the shell world. Collectors consider them one of the five most beautiful gastropod mollusks of the tropical seas. They exhibit a wide variety of colors with magnificent markings and, within certain limits, a wide variety of shapes and forms.

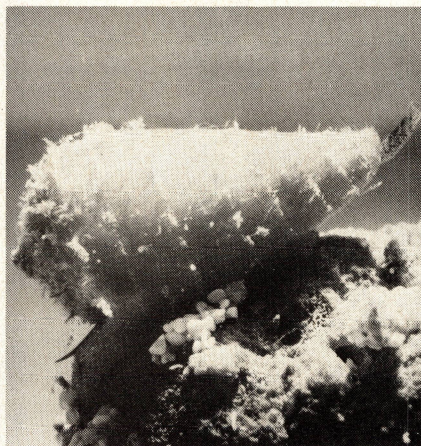
The pertusa cone is small, from one-half inch to about two inches in length when fully mature. It was first described by Bruguiere from a shell collected in 1792. The pertusa shell is pale rose to light red in color in most areas, but may be yellowish. It has sparsely scattered white blotches usually in a band around the middle of the shell and around the shoulders. The Hawaiian color form of the pertusa cone is shown. A similarly colored form is found in the Marquesas Islands. Shells from all other areas are somewhat darker, ranging from pale rose to light red with the usual markings. In some areas this little cone shell is called the punctured cone shell because the surface is covered by fine striae which are filled with tiny punctures. When alive, as in the photograph, the shell is covered by a thin, palely transparent, nodose, periostracum. The animal is pale yellow in color.

*Conus pertusus* Bruguiere, 1792, is distributed throughout the Indo-Pacific molluscan province from Hawaii southward to the Marquesas, the Tuamotus, and the Society Islands; southward to Australia, then westward through the Indian Ocean to Madagascar and northward through the Philippines. This shell is not found in the Austral Islands or the Gambiers. It is considered rare in all of French Polynesia and uncommon throughout the rest of its range.

There are more than 500 living species of cone shells, the majority of which are found in the Indo-Pacific area. The major characteristics of cone shells are their nearly straight-sided shells, the straight, narrow aperture, and the pointed spire. The later characteristic is quite variable. Most, but not all, species of cone shells have a chitinous operculum that is always much too small to close the rather long aperture. Also, most cone shells have a periostracum.

Cone shells are normally night feeders and are carnivorous. Like all other cones, the little pertusa cone has a poisonous radula dart with which it stings and paralyzes its prey, usually some type of marine worm. It can also sting an unwary collector. The sting is not likely to be dangerous, although a person susceptible to stings might have a strong reaction. Only a very few of the more than 500 species of cones are considered dangerous to humans. However, to be safe, all cone shells should be picked up and handled by the large (base) end. They should never be tucked into pockets, under wet suits while diving, or carried in a shell bag that can hang against the collector's body.

The habitat of the pertusa cone is sandy silt under small to medium sized coral heads or loose coral chunks where it browses for its food. In an aquarium it is an active shell and makes an excellent sand burrower. All cones reproduce by laying egg capsules, most of which are think, leaf-like bunches deposited in the



photograph by Olive Schoenberg

sand or on the underside of coral. In the case of the pertusa cone, the egg capsules are deposited on the underside of small coral outcrops. It is believed there is a planktonic larval (veliger) stage after which the cone settles to the bottom. There, if all conditions are right, it develops into an adult shell.

Readers of this column may receive a 35mm color side of the pertusa cone by sending a self addressed, stamped, envelope with their request to Shell Collector's Notebook, % SKIN DIVER Magazine, 8490 Sunset Blvd., Los Angeles, California 90069. Please allow five to six weeks for delivery. »

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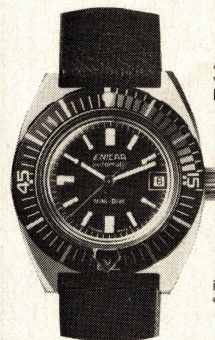
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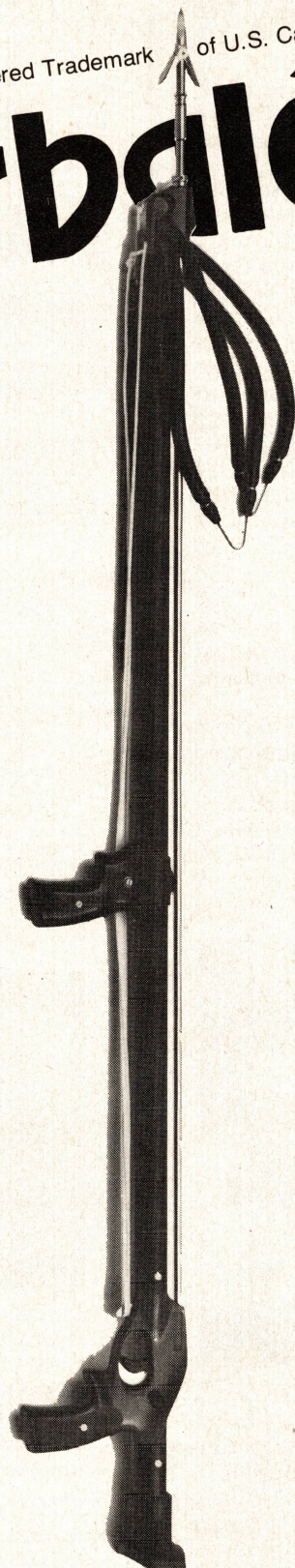
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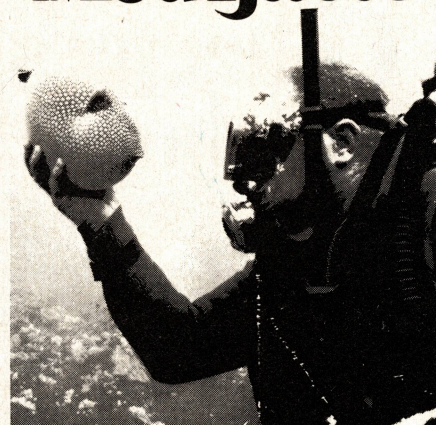


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## Medifacts



Charles Brown, M.D.

### AQUATIC FIRST AID

*SDM's Medical Consultant, Charles Brown, M.D., believes divers must know what they can and can't do to aid a fellow diver in distress. This is the second half of a two-part article on aquatic first aid.*

### SKIN RASH/ITCH

A localized painless itchy rash is most often contact dermatitis. Poison oak is a prime example. Another is the rash that develops under the ring or watch strap of sensitive people. Some divers get it on the face, from mask allergy. One should stop the contact at the first sign of trouble, and cleanse the skin. A hydrocortisone type cream is quite helpful. Hypoallergenic masks, by the way, are now available. Contact dermatitis can also be diffuse, as in the diver sensitive to his wet suit or to something in the water. Antihistamine tablets help, and stubborn cases are benefitted by hydrocortisone type hormones that come in the form of spray or pills (prescription required).

Various rashes anywhere on the body can result from eating, inhaling, or even touching something you're allergic to. A particularly distressing type is the generalized red itchy wheals called urticaria. And in highly allergic people the contact can produce the giant hives of anaphylactic shock. This demands the quickest possible medical help; an injection of adrenaline is life-saving.

If a generalized itching befalls several divers who ate the same fish, it's scombroid poisoning; give them antihistamines. A diffuse itching or prickling with or without a mottled bluish rash may be skin bends. Observation in the vicinity of a chamber would be prudent. Any dermatology text will list an incredible number of other eruptions with unpronounceable names, but these are rarely first aid problems.

(continued on page 30)



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# Medifacts

(continued from page 28)

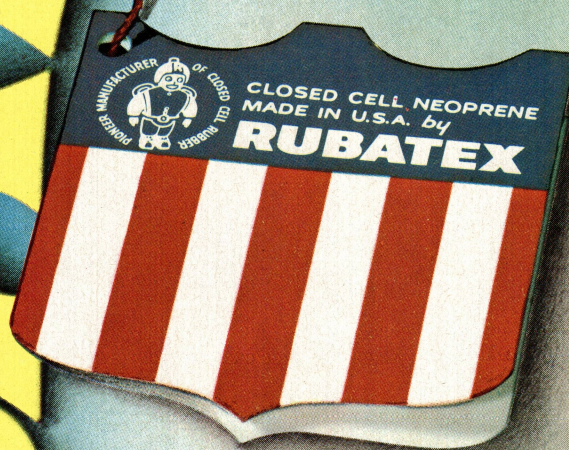
## PAIN

The list of causes being endless, we'll confine ourselves to some general remarks and some dive-related examples. Chronic or recurrent pain always has a basis and should be investigated before one takes up diving. Acute pain is a warning that something bad for the body is happening, and you'd better find out what and take prompt corrective action to avoid further damage. As a symptom, pain varies widely in specificity. Some kinds of pain strongly suggest what's causing them, while others give no clue.

**Headache.** Headache is among the least specific of symptoms. If you have one, the only safe course is to consider yourself ill, and not dive. Hiding it with aspirin in order to dive invites trouble, including bends. If a headache begins during a dive, however, its specificity is improved and it does suggest several possible causes. A common one is carbon dioxide retention, easily reversed by breathing deeper and faster. Another is a too-tight mask strap. Another is sinus squeeze; while sinus pain is usually localized to a cheek or over an eye, less common involvement of the sphenoid sinus will produce a deep headache. A rare cause of headache these days is contaminated scuba air. Finally, some people subject to migraine find that diving tends to precipitate an attack. Whenever immediate corrective measures cannot be taken or do not work, the dive should be aborted.

**Ear pain.** All divers know that clearing their ears stops squeeze pain during descent. But suppose the pain begins after 45 minutes at one depth. In some people, the nasal membranes swell up when exposed to cold temperatures, and since middle ear air is constantly being absorbed into the body, a relative vacuum will develop. Try your clearing maneuver. Persistent eustachian blockage may follow squeeze damage and produce pain sometime after a dive. Try ear clearing maneuvers and decongestants. If these don't give prompt relief, middle ear infection is likely, so see your doctor. External ear infection can be painful, too, and also calls for medical attention. If you are prone to otitis externa, an acid-alcohol (Domeboro or VoSol mix) Put into the ears before and after each dunking is good prophylaxis.

If the doctor finds nothing wrong with your ear, but the pain won't quit, it's usually referred from the temporomandibular joint. That's the hinge joint of



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the jaw, and it's probably complaining because you kept your teeth clenched on your snorkel and regulator.

**Trunk and limb pain.** Muscle cramps in the water are due to over-use, and cold predisposes. Rest and stretch the offending muscle. Ashore, heat and massage will help. The first hint of any cramp should send a swimmer without buoyancy out of the water, for the instant he can't make effective movements, he'll sink and drown.

Bruises, strains, and sprains are treated with elastic support, ice packs, elevation, and rest. Walking on a badly sprained ankle, toughing out the pain, will delay healing considerably; furthermore, the ankle may heal with its ligaments overstretched, and lack normal stability. Any pain in the neck or back raises the question of spine fracture. Seek a history of trauma, and check for confirmatory evidence (described later).

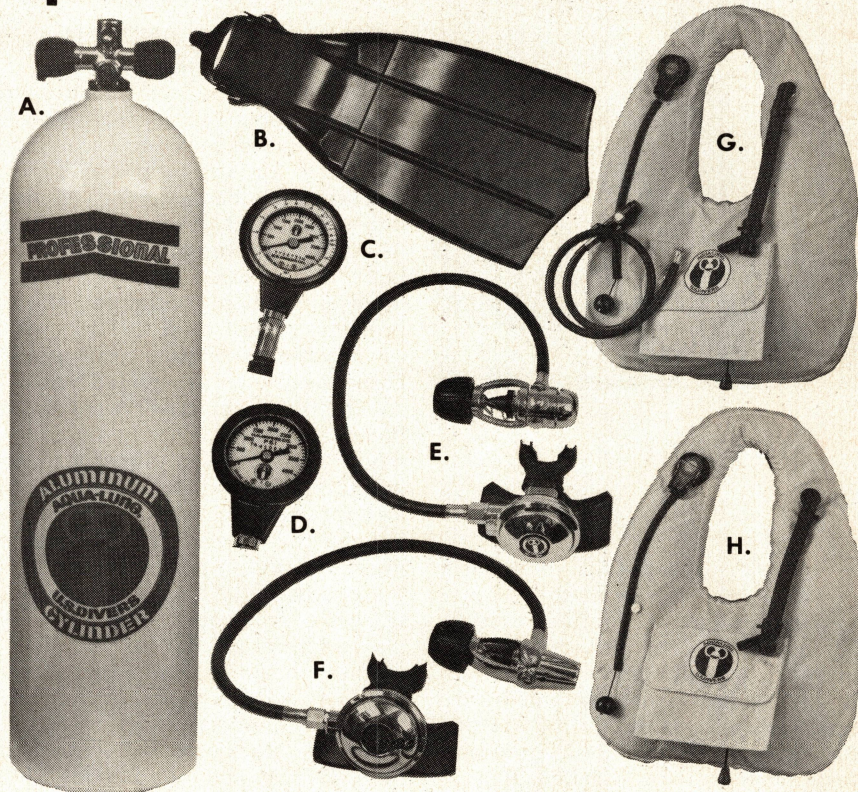
Any diver who stuffs his stomach and then over-exerts is asking for intestinal cramps. The cramps of fish poisoning, or of food poisoning from the lunch you left in the hot sun too long, will be accompanied by nausea and vomiting, and often diarrhea. Without medical help, there's little one can do except to rest the body and the belly, and wait. If pain persists, see a doctor — even divers can get gallstones and appendicitis.

Severe low abdominal pain is the lot of the imprudent diver with a strong gastro-colic reflex. Putting food in the stomach stimulates the bowels to evacuate, and with certain people and certain foods, this can be a very powerful reflex. Such a diver, who dons his wet suit and dives right after the meal, might soon find himself in agony. There's nothing for him to do but to get out and relieve himself.

Any pain within 24 hours of diving and without obvious cause is considered bends till disproven. The typical description of a limb bend is a deep boring ache in or near a joint, without redness or swelling, and unrelated to movement. But there are exceptions, and one can't afford to feel secure if the description doesn't fit. A trick often suggested is to put a blood pressure cuff at the affected site and pump it up as far as the dial reads. If this stops the pain, you have your diagnosis and cure at the same time. When uncertainty cannot be resolved, a trial of decompression is warranted. An important point not widely realized is that abdomen or back pain is often the first evidence of a spinal hit. The diver should be alert for the appearance of any numbness in the legs, weakness, or loss of coordination. Many have ignored such symptoms until too late, and wound up with permanent damage in spite of recompression chamber treatments.

(Continued on Page 38)

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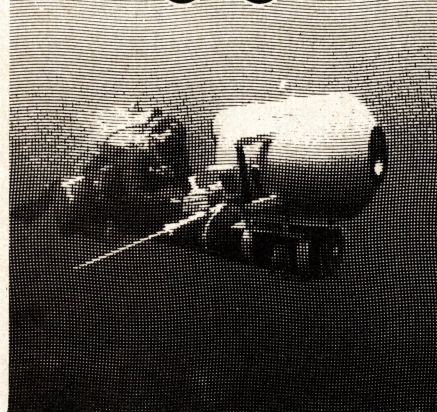
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# Technifacts



BY E. R. CROSS

The basic purpose of this column is to stimulate an interest in the technical aspects of diving and in dive safety. It will be devoted to providing factual answers to questions from SKIN DIVER readers. Answers will be designed to apply to the majority of dive situations, problems, and equipment encountered in today's diving.

For their questions and comments used in this month's Technifacts I would like to thank Robert P. Burhoe, West Hartford, Connecticut; Oswald Hilderson, Salisbury, Maryland; and Dennis R. Tallent, Baytown, Texas.

## FOLLOW UP ON SEARCH AND RECOVERY PROBLEMS

In the last Technifacts a reader wrote regarding some of the problems he encountered, or expected to encounter, in the search for, and recovery of, a truck and driver that had gone through the ice into a lake. Exact location in the lake and depth of water were not known. Technifacts outlined recommendations and offered suggestions pertaining to those problems. Since then a letter was received from the original correspondent. Parts of his letter are quoted below.

"The truck and driver went through the ice in October, 1975. In March, 1976, when the ice thawed, the driver's body was found floating on the surface of the lake approximately at the place the truck entered the water. The body was well preserved and in perfect condition."

Apparently the body of the diver had washed or fallen out of the truck when it crashed through the ice and had remained in almost the same location throughout the winter.

The Technifacts reader went on to say, "The truck was not located until June, 1976. It was found about 500 feet

from the point of entry into the water at a depth of only 50 to 75 feet. It must have continued on course as it sank. The window of the truck was found open."

This is typical of search and recovery jobs of this type and restates the uncertainties that are encountered by search and rescue teams. I would like to again stress the necessity of a search and recovery job of this nature; particularly whether or not the job has to be done at all. If so, is there truly an urgency that makes it necessary to risk the lives of divers who must work under conditions as adverse as the winter conditions outlined in this reader's letters.

## DRY/WET SUITS

Some time ago a reader wrote stating, "A product is now available called a dry/wet suit. What are its merits? What are its disadvantages?"

Several new systems have been developed in recent years to provide thermal life support for divers working in very cold water. I believe this reader is referring to the variable-volume dry suit. This is a one-piece diving dress made of closed-cell, foam neoprene and closely resembles a conventional wet suit. It is constructed of either 3/16 inch or 1/4 inch neoprene with both external and internal nylon linings. It will effec-

(continued on page 36)

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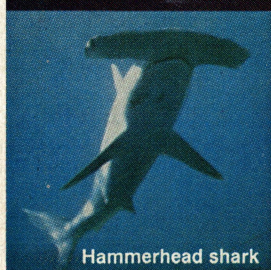
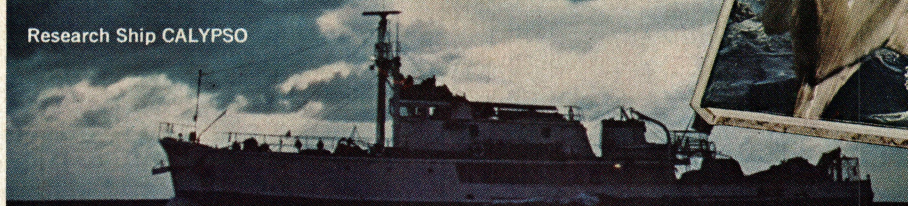
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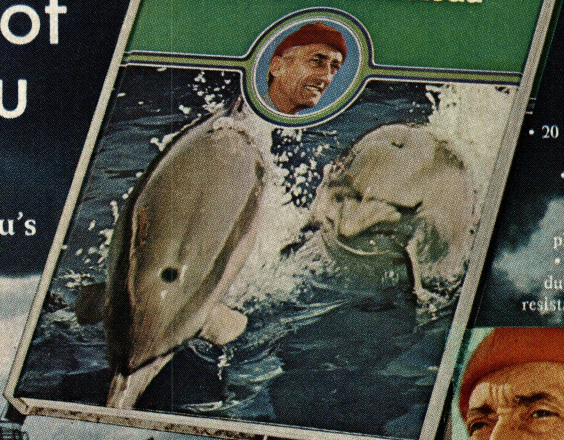
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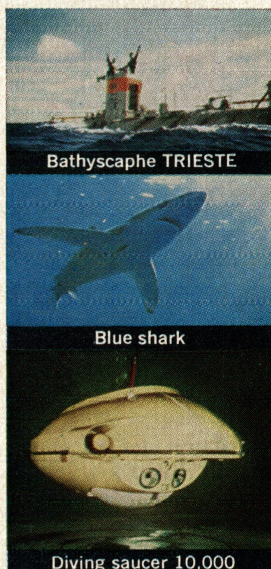


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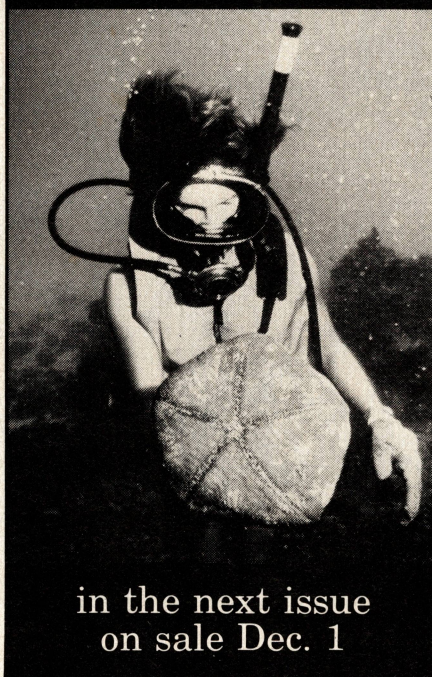
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## Technifacts

(continued from page 32)

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There are advantages and disadvantages to the variable-volume dry suit. Primarily the advantages are that the suit is warmer than conventional wet suits; it is easier to maintain than hot-water suits; it requires less support personnel and equipment than hot-water suits. Its disadvantages are: a slight increase in stiffness and bulk making long swims tiring; inlet and exhaust valves can malfunction; a torn seam or accidentally opened zipper can cause a drastic loss of buoyancy and extreme thermal stress; and the suit is more expensive. Also, if the diver gets upside down, air can enter the feet of the suit and cause overinflation, loss of fins, and loss of buoyancy control.

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(continued on page 96)

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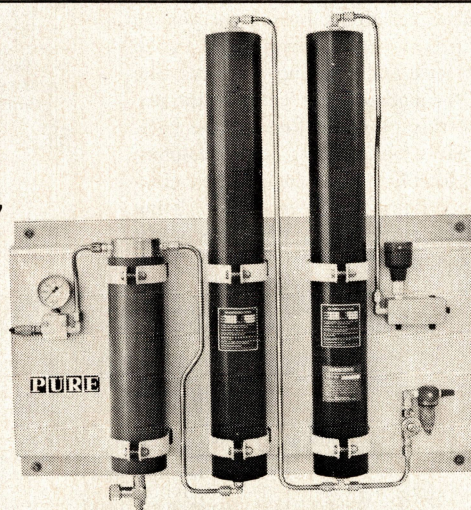
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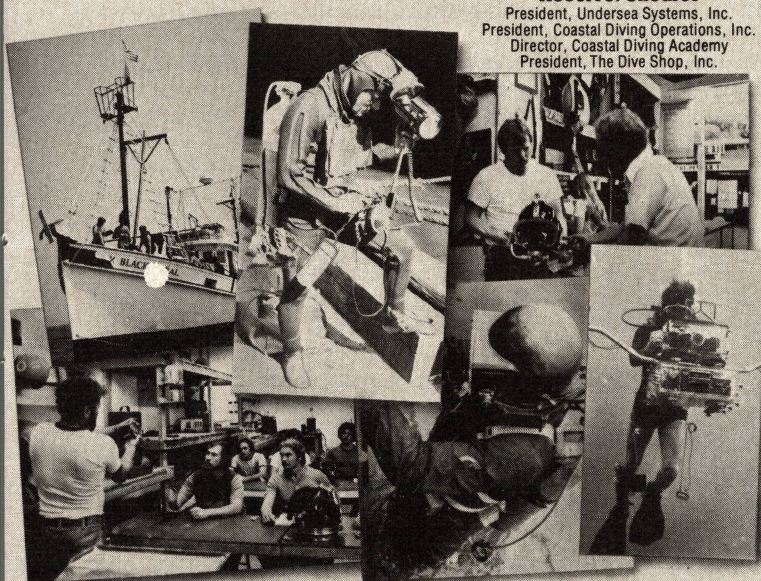
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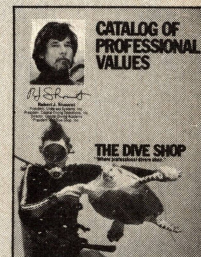
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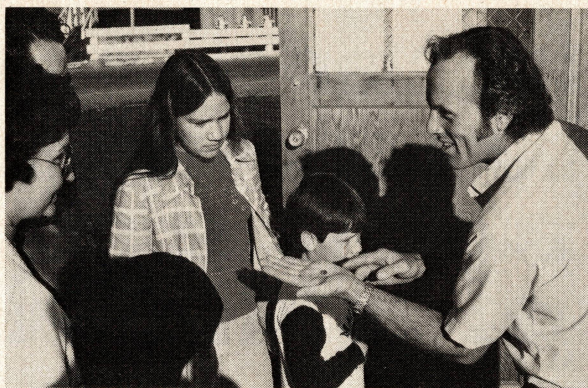
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# Farming Abalone

BY JACK DRAKE



photography by Author

I swam slowly through a kelp forest at Santa Cruz Island looking for just the right kind of bottom. Clutched in my hand was a closed plastic bowl. I came upon a small isolated reef. "Looks good," I thought. "No crabs or starfish, several recessed cracks in the rocks, and a lot of algae growth."

I settled on the sand and removed the bowl's lid. Inside were 23 one-inch abalone. I gently slid one out and placed him far back in a crack. I watched as he attached himself to the rock and slowly moved about exploring his new home. I gave him a few other young abalone for company and swam off looking for a new area.

The planting of these baby abalone is part of an ambitious project by the Santa Barbara Mariculture Foundation (SBMF), aimed at preventing the aba-

lone from becoming an endangered species and possibly extinct off the coast of Central and Southern California.

Many restrictive regulations centered around harvesting techniques have been suggested as a way to stop the downward population spiral of the abalone. But even if there were a complete moratorium on harvesting, it would take possibly 150 years or more to restore the abalone population to its normal level.

What is actually needed is to not only restore the abalone population but increase the size of this population to allow an increased harvest to meet the demand; in other words, farm the abalone instead of hunting it. This is the goal of the Mariculture Foundation.

The SBMF feels the most practical and effective way for restoring the aba-

lone population is to artificially seed the reefs with baby abalone.

The seeding project, headed by marine zoologist Jim Hudson, has incredible potential because the techniques used eliminate many of the risks of natural population growth.

In the natural environment, the eggs and sperm of abalone are released into open water and depend on favorable oceanographic conditions and luck to bring them together for fertilization. Although six million eggs and 100 million sperm are released at a time, it is theorized only one percent of the eggs will be fertilized. With the abalone population so thinned out, fewer eggs and sperm are available for fertilization and the chance of their finding each other grows even slimmer. After conception, a free-swimming larva is formed. As the abalone develops, it grows a foot and a vellum which is used for swimming.

Four to seven days after fertilization, the young mollusk settles to the bottom in search of food and habitat. If it finds a hospitable area, the animal remains and starts its crawling existence. If not, it can spend several more days swimming in search of a good area before it will die. During this time the abalone is extremely susceptible to predation and currents that can carry it out to sea.

I stopped by the hatchery on Stearn's Wharf one afternoon and found Jim Hudson showing a group of curious tourists around his small, but well-equipped lab. "We carefully select parent abalone and then condition them in these holding tanks regulated to duplicate the actual ocean environment, currents and all. This conditioning keeps them in excellent physiological condition and ensures production of hearty eggs and sperm. When the animals are about to spawn, they are transferred to these tanks where the eggs and sperm are released."

Jim removed a thumbnail-sized abalone from a tank, placed it on his fingertip and continued on. "As the larvae grow, we feed them special algae that results in remarkable growth rates. This little guy grew from one-quarter inch to one-half inch long in just one month. The type of food eaten has a direct effect on the exterior color

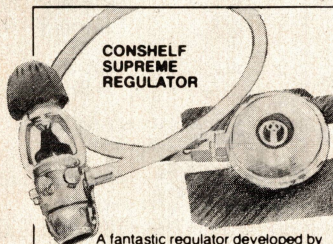
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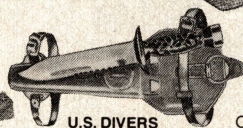
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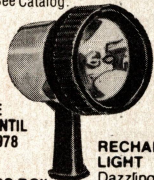
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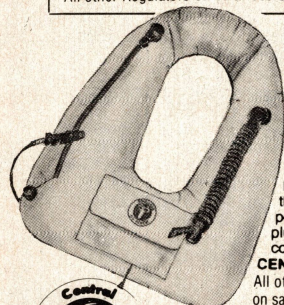


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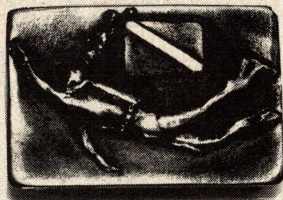
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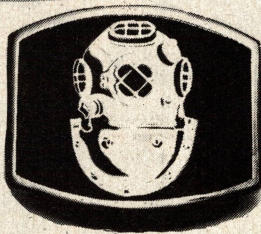
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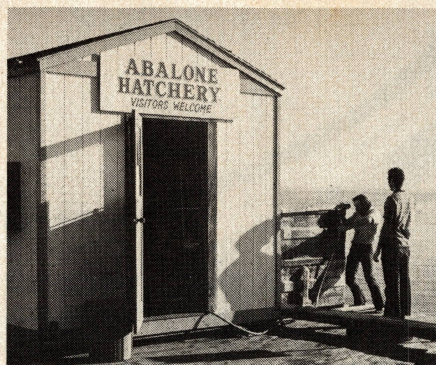
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of the shell. By alternating the diet of the young abalone we can produce banded shells like this which gives us a means of tagging the ab and monitoring it once placed in the ocean."

Jim explained the function of some of the equipment he was using and then invited his visitors to have a look around his lab. While they did, Jim told me Japan has had a very successful seeding program in progress for the last ten years. Results have been incredible. Data from the Yearbook of Fishery Statistics published by the Food and Agriculture Organization of the United Nations indicate that in 1960, eight and one-half million pounds of abalone were harvested by Japan. The harvest increased to 14 1/4 million pounds in 1970 as a direct result of their seeding program. Statistics for the United States, predominantly a reflection of California production over the same period of time, offer a very dismal outlook. The ab harvest has dropped from four million pounds in 1960 to two and one-half million in 1970. Research by the Calif. Department of Fish and Game indicates that the same techniques used in Japan are adaptable to California waters.

Although several other abalone mariculture projects are underway on the Pacific Coast, the work carried on by the Santa Barbara Mariculture Foundation is unique in several ways: 1) The young abalone will be transplanted to areas of the ocean open to the public and will be available for everyone's use. 2) Interested divers can participate in the transplanting and monitoring after attending a short, foundation training session. 3) Information obtained from research is available to everyone.

Once the project gets completely underway, it is hoped up to 20,000 abalone a month will be transplanted to appropriate reefs both on the coast and the Channel Islands. The cost per ab, only 20 cents. Jim expects the cost to drop even lower once mass production procedures are put into use.

The Santa Barbara Mariculture Foundation is a nonprofit organization primarily supported by funds donated by commercial divers, seafood processors, a few local businesses, and a grant from the County of Santa Bar-

(Continued on Page 73)

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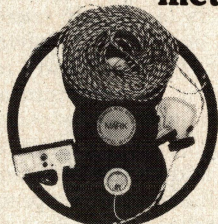


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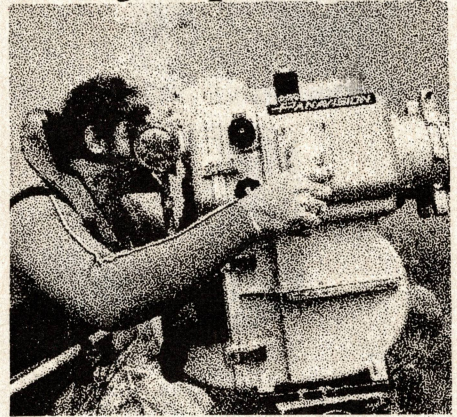
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# Film Festivals 'n Symposiums



## INWARD TO THE SEA FESTIVAL

Whales, armor, and a behind-the-scenes look at the filming of *THE DEEP* are part of the wide-ranging program of the 6th annual Inward to the Sea conference in Washington, D.C. This year, the international underwater film festival will be held on November 5, from 9:30 a.m. until late in the evening. It's in the Lisner Auditorium of the George Washington University, 21st and H Streets, N.W.

Paul Tzimoulis, SKIN DIVER's editor/publisher, will host the evening film show at 7:30 p.m. Among the films he'll introduce will be *Night Life*, a brief-but-beautiful film by Oscar-winner Robin Lehman; *The Shooting of THE DEEP* with underwater photographer Stan Waterman; *World Beneath the Sea* by James Dutcher; and *The Day of the Whales*, an introduction to the humpback whales off Hawaii, again with Stan Waterman.

*The Invisible Sea*, a beautifully-done film on the wonders of oceanic microbiology, presented by Prof. Rita Colwell of the University of Maryland, and a review of the problems of aluminum air tank corrosion and dive safety statistics by John McAniff of the University of Rhode Island will add to the program. Paul Tzimoulis will also lead a special discussion of the techniques and possibilities of underwater macrophotography. A reception for participants and speakers begins after the film show.

Tickets are \$3 for the seminars, \$4 for the film show, and \$6 for the reception. For tickets and information, write Inward to the Sea, P.O. Box 41010, Washington DC 20014. Or telephone the Sea-Line (202) 347-0206.

## CEN-CAL COMPETITION/FILM FESTIVAL

The Second Annual Cen-Cal Film Competition and Film Festival will be held Saturday, November 19, at the main theater at Chabot College in Hay-

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ward, California. Tickets are \$3.50 in advance and \$4 at the door; the doors open at 7:30 p.m. and the show starts at 8 p.m. The show will include professional movies, tape/slide shows, and all slide entries. Winners will be announced and given their awards that night. Competition is limited to Cen-Cal members.

Professional shows include a new, local comedy entitled *The Adventures of Scuba Man* in color.

Tickets are available through local dive shops and Cen-Cal dive clubs. Order them by writing: CenCal, P.O. Box 779, Daly City, Calif. 94017.

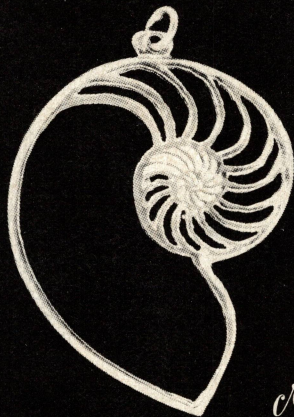
### AQUA SPACE '77

Aquatic Exploration and Research Associates (AERA) is a nonprofit organization that had its beginnings just about one year ago when a group of divers in Windsor, Ontario, Canada decided they wanted to tackle more ambitious projects than the typical weekend dive.

A number of projects were launched, including filming a documentary on the smelt run at Point Pelee National Park and the assisting of a member of AERA in the making of documentary film on the Florida manatee. In addition, AERA organized courses in aquatic archaeology taught by a professor from the University of Windsor. This led to member participation in an U/W archaeology expedition off the Yucatan.

Now AERA has formed the Aquatic Sciences Institute which will offer courses in U/W archaeology, biology, communications, geography, photography, geology and cinematography. AERA is also organizing its first dive festival, Aqua Space '77, to be held November 5 and 6 in Windsor, Ontario, Canada. Windsor's own Jack McKenney, former editor of *SKIN DIVER* and award-winning film maker, will present some of his recent films as the highlight of the program. In addition, Tom McCollum will show the films *The Blue Holes of Andros* and *Stoneman of Mako*. Dr. Joe MacInnis will send one of his recent films for presentation, and there will be multimedia slide shows by Ron Stephensen and David Waud.

Trophies and prizes will be awarded in U/W photography, cinematography and research. A trophy in Jack McKenney's name will be given the best film, and a trophy in Dr. Joe MacInnis' name will be given the best research submitted to the festival. For more information about AERA membership and the festival, contact Mahmut Suner, P.O. Box 3054, Tecumseh, Windsor, Ontario.



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# the gentle art of *Fish Feeding*

have fun making new  
friends under the sea

by lou fead

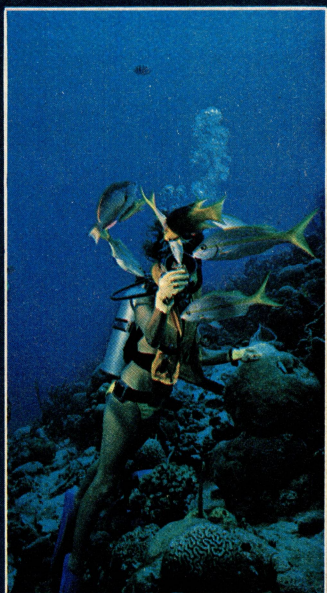
**H**ow would you like to dive like Jacqueline Bisset in *THE DEEP*? I know some of you want to look like her, and others want to look at her, but I am talking about the way she fed the fish in our beautiful marine world. If you would like to try it, read on so you can avoid the problems Lou Gossett had in the same movie when he fed the voracious moray eel.

Before learning the mechanics of feeding marine life, let us set guidelines: friendly feeding involves a mutual respect between feeder and feedee, does not destroy the environment, and may involve some biting. A short review of each guideline follows below.

## RESPECT MARINE LIFE

The basic guide for successful communication with our subsurface friends is: treat them with respect, and they will do the same (a wet Golden Rule). Divers bounding onto a reef with great bubbling and much finning will rightfully earn a cold response from its residents. Fish will swim away, bugs will retreat, crabs will sidle off, and there will be no one for you to play with.

If, on the other hand, dive buddies enter calmly, quietly, and non-destructively, the residents will tend to stick around. Should the divers remain motionless, their reward will be an intensive investigation by the curious. They will become the center



photograph by Steve Earley

*Respect is the key in the gentle art of fish feeding. Move slowly to lure the sarcastic fringhead (above) to dinner.*

ring of reef attractions. And, if the intruders offer food, there is bound to be a party. But, rapid motions, which look like aggressive gestures to animals, will make the aliens unwelcome. Aggressive actions will invite retaliatory actions. Respect — and you will be respected!

The beginning fish feeder may want to test that guide on small animals first, or on animals too slow to rip off a finger. Starfish are recommended, and are not alone in their speed class. Abalone, anemones, and sea urchins qualify speed-wise as not being able to catch and quickly devour divers.

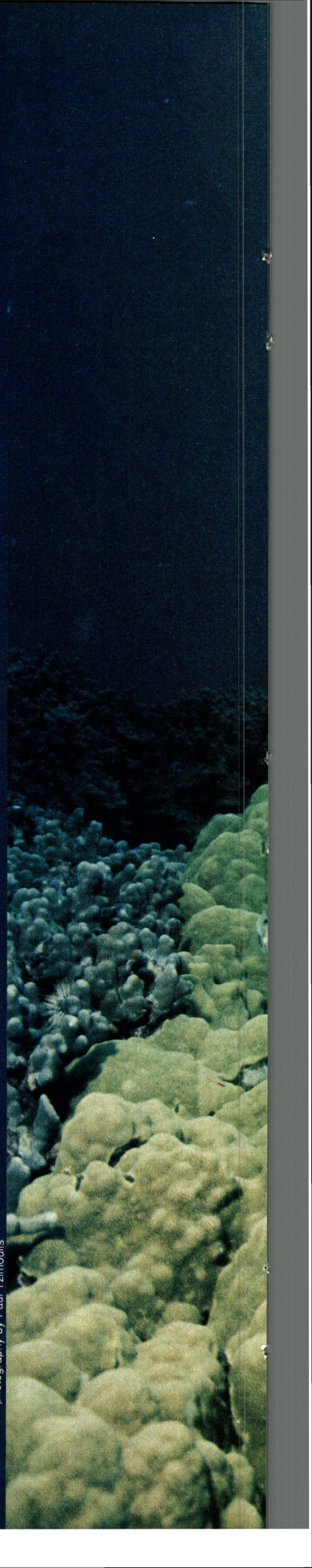
After adapting to semi-sedentary life, try the "respect" approach on mobile life, like little fish, before you enter into culinary conversation with big biters, like 15 pound sheepshead. Please take care for even a small fish can easily nip holes in your soft, unprotected skin.

Show your respect, but sprinkle it with discretion. If you make overtures to a large animal, and it falls in love with you, realize that its love pat may be more than you can handle. Marine mammals are particularly known for getting pushy if you stop feeding them after they have started the dining process.

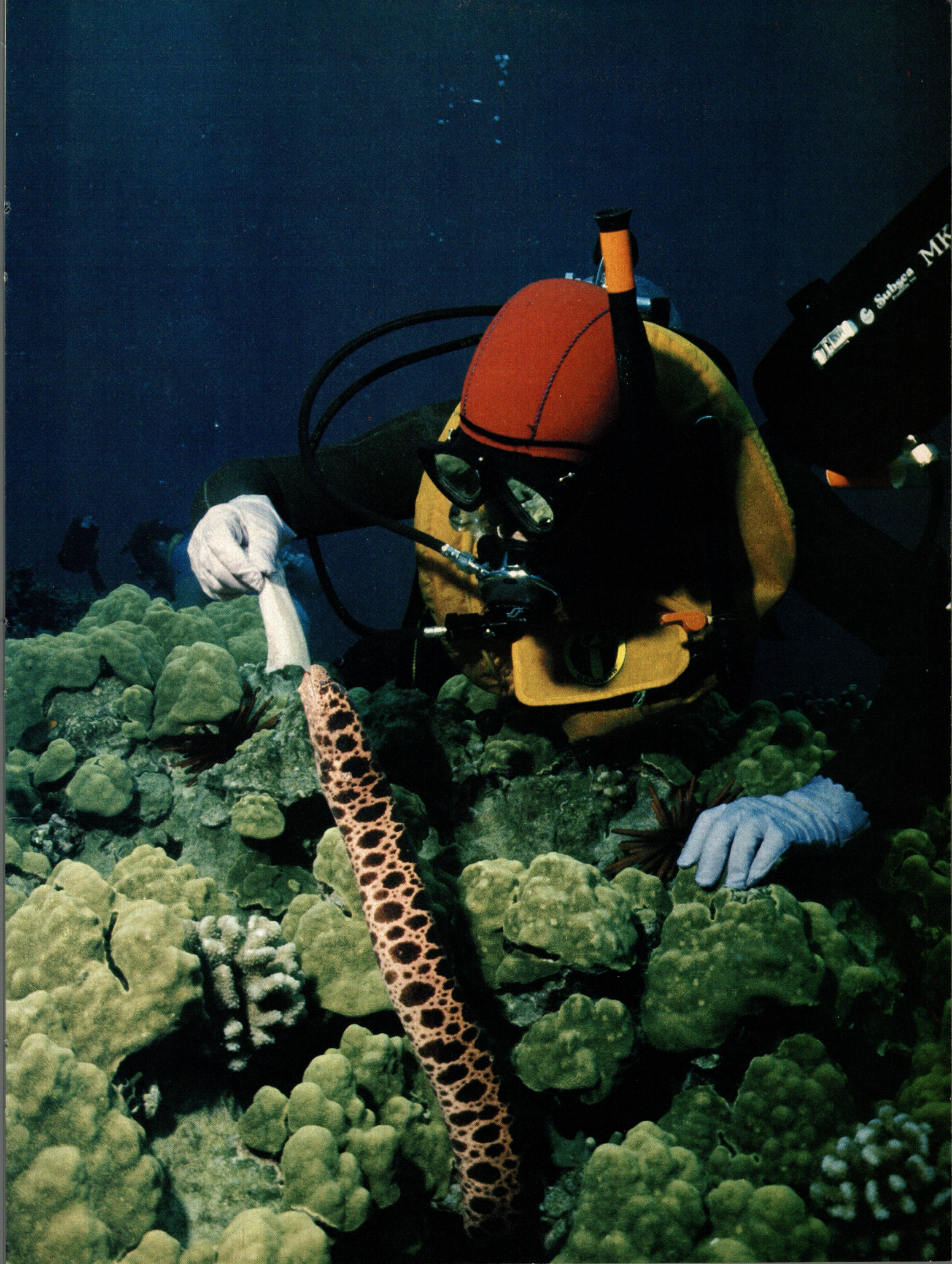
## RESPECT THE ENVIRONMENT

Besides respect, your feeding should not destroy the environment; it should only augment it. If you enter an area, pick all the sea urchins, and feed them to the fish, you are upsetting the ecology terribly. (Did you know that sea urchins snag drift kelp for abalone to eat?) The results of such interference are unpredictable except that years

photography by Paul Tzimoulis









may be needed to return to a balanced ecosystem. Divers are encouraged to bring foods to the feeding site, not find them there. What type of food works best?

Foods vary in effect, therefore local experimentation is necessary to determine the best. It should be attractive to the animals, easy to manipulate, and readily available.

Bread, crushed and squeezed into a ball (a slice falls apart too easily) is used extensively in the tropics for free-swimming fish. In Southern California, tortillas were tried, but with little success (apparently tastes offshore differ from those onshore). Fish carcasses, abalone trimmings, mussels, frozen squid, and anchovies have proven quite useful in feeding fish, starfish, shells, anemones, lobsters, crabs, moray eels, and octopuses. Such morsels do not excite abalone, since they are herbivores and respond only to kelp — which just happens to be floating around.

### RESPECT FOR BITERS

Sometime, someplace, somehow you will probably be bitten by an eating animal. If you do not accept that risk, then do not feed. If you do accept it, recognize that the bite usually comes from carelessness or bravado.

A fish bite, or an eel bite, is not too bad, even though it may hurt and bleed. An abalone bite or shell bite does not hurt at all. An octopus bite involves a poison, while a shark bite is quite dramatic. Any bite should receive medical attention for cleaning and prevention of infection. Again, watch out for marine mammals because their bites, like a dog's, can be quite troublesome and painful.

A bite by a fish may be just a pinch on the finger, but a six-inch seniorita cleaner fish can chop a chunk of lip quickly. A crab's bite is of little concern while its grip is excruciating. A California moray eel's bite mimics the needle pricks at the Blood Bank, but it can tear flesh easily. The eel will let go before tearing, if you push your bitten part into its mouth to release the barb action of its backward-pointed teeth. Just recall that your hands and fingers do not please its palate. Humans are not part of the marine food chain.

Looking back, our feeding of marine life will probably involve a bite now and again, should not harm the ecology of the area, and should be done with respect to be most effective and enjoyable. Now for the details of fun feeding!

### FEEDING TECHNIQUES

Some proven methods of feeding marine animals can be seen during a dive in Southern California. Follow the description with caution; do not exceed your personal diving limits, whether they be for depth, time, minimum air for surfacing, or degree of involvement with marine life.

While suiting up, pack the food in a "fish feeder" of some sort; a plastic bag in your hand or goodie bag, or, a plastic screw-top freezer jar tied to your instrument caddy. Frozen food will thaw in a short time after submersion, is easier to handle, and smells less before the dive.

Submerged in the feeding area, you attract marine life by chumming. Crush some anchovies and casting the pieces into the water above the bottom, fin back out of the way, to let the fish develop a taste for your goodies. Chumming does not work well on starfish, anemones, nor abalone, but the more mobile animals will come from afar for dinner. When the eaters are masticating with gusto, present an anchovy at arm's length and eye level like the Statue of Liberty — be still!

The fish will soon be eating out of your hand. Whee! You can then get both hands into the action; one to feed, one to feel the fish gently, not abruptly. What a sensation — to pet a live fish, especially with bare hands. If you want to protect your fingers, wear gloves — and miss a lot of fun!



Some folks say that touching damages the fish, so ask the local marine biologist about your eaters. Ask also about the fish that nibble at your fingers; do they hurt themselves?

After feeding fish and starfish, try an abalone: Take a kelp frond (leaf) and place it about one-half inch from the ab's mouth. That is at the end of the vent hole line under the flatter end of the shell. A hungry ab will rear back on its foot and leap on the kelp to tuck it under its shell. If you float between that ab and its dinner, do so at your own risk. A hungry ab is voracious — a full one ignores everything.

An octopus tucked in its home will send an inquiring tentacle out to snatch a tasty morsel. Its shyness usually makes it flee the scene to eat in peace away from prying eyes. A California spiny lobster flees also, but uses a long time to take the food. Patience is required, but having a bug grab you instead of vice versa is worth the slight chill from being immobile. Crabs seem to disregard the chef once dinner is served. They move a lot faster than expected, and are not very accurate in their reach, so watch those claws! Are any of you ready to feed moray eels now?

### FEEDING MORAY EELS

Morays require more respect than toothless animals. That respect manifests itself in three specific techniques applicable to feeding all animals capable of biting:





photography by Paul Tzimoulis

1. Do not offer food with a bite-sized part of your body.
2. Offer food with the hand you can afford to have bitten.
3. Use a gloved hand for feeding, an ungloved hand for petting.

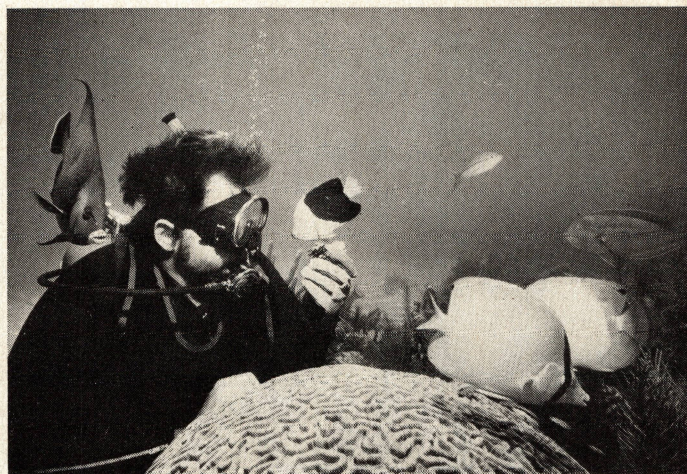
A diver will normally grasp food with a thumb and forefinger. Either or both of these will fit into an eel's mouth, but a fist will not. So, make a fist, put the gills of the anchovy between the bases of the second and third fingers (gills hold better than a slippery tail) then present the fist to the eel. Voila, it can bite the anchovy, but not your fist.

Most people feed with their dominant hand. If that gets bitten, writing home of the experience is a pain. Right-handed divers feed with the left hand, and lefties use the right.

Dive gloves are designed to give protection from cold and abrasion. Most marine animals cannot penetrate gloves with their teeth, and it takes a particularly active moray to do so. Therefore, to pet with relative impunity, use a gloved hand with food to entice the animal across your naked petting hand. Using a glove removes that hand from concern so you can concentrate on the exposed hand. If the naked hand is pressed to the surrounding rocks, the animal will usually ignore it, after a cursory examination, in favor of food. When the animal is not looking, ease it into petting. Make no rapid movement or your fun may turn into pain as teeth meet flesh. Respect is the key. Move slowly and increase your joy.

Feed the animals on your dives to more completely communicate with and enjoy the marine environment. But, until conservation becomes a way of life for all divers, expect that someday you will see your favorite marine dinner companion being landed by a diver not sharing your respect for the marine world. ➤

*Fish foods vary in effect. Abalone trimmings, mussels, frozen squid, bread and anchovies have proven extremely useful. Crush some anchovies, cast the pieces into the water and wait quietly. The fish will soon be eating from your hand.*



photograph by Bill Crawford

*Friendly feeding may involve some biting. The cautious feeder wears a glove on the feeding hand. This leaves the ungloved petting hand free to experience the joys of getting acquainted. Bites usually result from carelessness or bravado. An absence of sudden movement makes interacting with most animals quite harmless. Bites are a relatively small risk many divers consider worth taking.*



# U/W Photography In 12 Easy Lessons

Lesson 11:

## Selection and Use of Super-8 Movie Cameras

BY JIM AND CATHY CHURCH

**T**his lesson has two basic goals: First, we want to introduce you to the camera equipment used for U/W super-8 moviemaking. Second, we want to get you started with the basics of how to film a movie story.

### SUPER-8 MOVIE CAMERAS

Let's begin with some of the important features you should consider when choosing a camera for U/W super-8 photography:

1. Does the camera have both electric drive and an automatic exposure control?
2. Does the camera have a zoom lens which will allow you to photograph both large (wide-angle) and small (telephoto) subject areas?
3. Will the camera (or housing) have a viewfinding system you can use when the camera is housed and your face is behind a mask?
4. Does the camera have an over- and underexposure warning light you can see when underwater?
5. Can you check for over or underexposure without triggering the film advance?
6. Can you see the footage counter and end-of-film warning easily while underwater?
7. Is it a compact camera that can be easily housed in a compact camera housing?
8. Is the lens f2 or faster for use in dim, U/W light?

9. Can close-up lenses be used, or does the camera have a macro lens which can be focused in for close-up work?

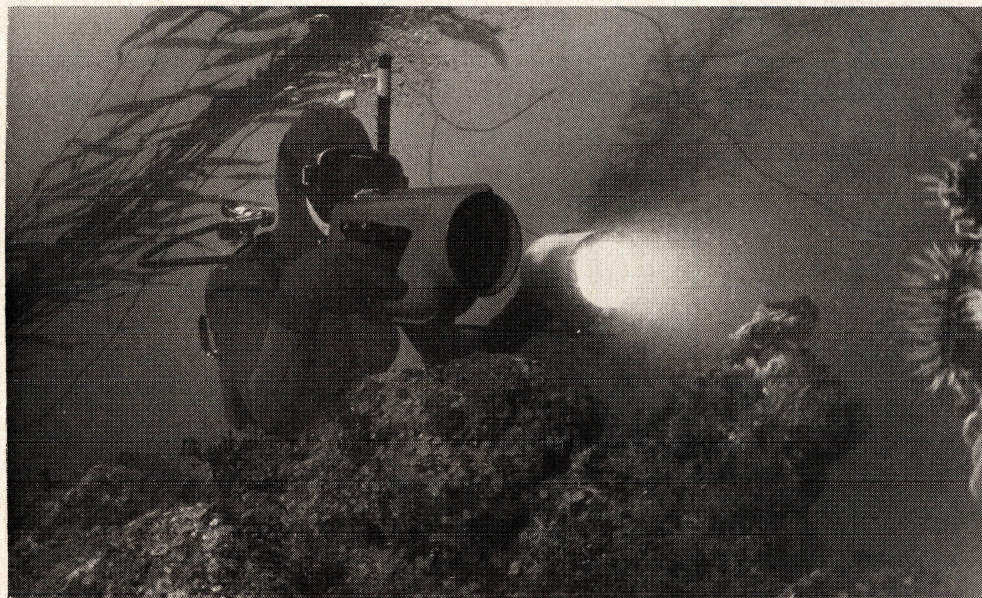
Of course, it may be difficult to find all of the above features in every suitable camera, and you may have to make a few compromises. The first decision is whether to purchase an XL (existing light) camera or a standard movie camera.

While there are other fine XL cameras on the market, we will limit our discussion to the Kodak XL cameras because of space. These are designed to take pictures in dim light without a movie light. The Kodak XL camera shutters are designed to give a longer exposure time to each frame of film, and they have fast, f1.4 lenses.

Kodak models XL 320, 330, and the older XL 33, have a moderately wide-angle 9mm lens and fixed focus. In dim light situations, when the lens aperture is wide open, you should maintain a minimum camera-to-subject distance of eight feet for sharp focus. This distance is much too far for most U/W photography.

Kodak models XL 340, 350 and 360, and the older XL 55, all have 9mm to 21mm zoom lenses which can be focused from six feet to infinity. With the lens set for 9mm and focused for six feet, depth of field extends from about four to eleven feet when the aperture is wide open at f1.2. Because you can get closer to your subjects, these models would be best adapted for U/W photography.

Many standard movie cameras (those not designated as



*Cathy Church (left) films underwater with the Oceanic Products Hydro 8, an aluminum housing designed for super-8 cameras measuring no more than 3 x 5.5 x 9.5 inches. Adjustable, ball-joint arms are available for attaching movie lights to left and right sides. A shutter control is provided, with other controls optional.*



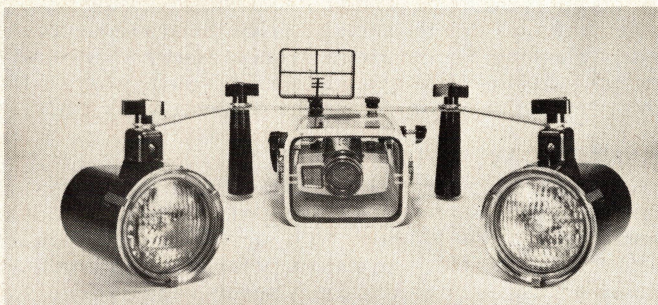
XL) can also offer excellent features for U/W moviemaking. However, as there are too many fine cameras on the market to discuss each individually, we suggest that you use the nine guidelines previously given to evaluate any specific camera.

### CAMERA HOUSINGS

There are five questions that you should ask when considering a housing for your super-8 movie camera:

1. What camera controls can be used? Note: In many situations all you really need is a shutter release control.
2. How difficult will it be to reload film?
3. Can one or more movie lights be easily attached to the housing?
4. How heavy and bulky is the housing — are lead handles required to reduce buoyancy?
5. How much does the housing cost, and how does this cost compare to competing housings?

photography by Authors



*Ikelite's housing for Kodak XL cameras and Ikelite's Modular Movie Lights (above) can be used with several XL camera models.*

Ikelite offers several transparent, plastic housings for various 8mm and 16mm movie cameras. Model #5733 has a shutter release control and is recommended for the Kodak XL 320, 330 and XL 33 cameras. Model #5755 has additional controls for the sunlight/tungsten filter, and for the power zoom the XL 350 and 360. However, any of these XL cameras will fit into either of these housings.

For ultra wide-angle filming, the "Green Things" Optical Housings (distributed by Aqua-Craft) offer the widest picture angle available for those who must live within a budget. Two models of the housing are available for the XL 33 (or 320 and 330). Model S-24 has an optical port which produces a 90 degree U/W picture angle, and model S-25 has a port which produces a 130 degree U/W picture angle. Two other models of the housing are available for the XL 55 (or 340, 350 and 360). Model S-26 produces the 90 degree picture angle, and model S-27 produces the 130 degree angle. These wide-angle optics give extraordinary depth of field — from as close as a few inches (depending on aperture), to as far as you can film clearly. Controls for shutter and filter are provided.

The Oceanic Products Hydro 8 is an aluminum housing designed for super-8 cameras measuring no more than 3 x 5.5 x 9.5 inches. Adjustable, ball-joint arms are available for attaching movie lights to the left and right sides of it. A shutter control is provided, and other controls can be installed.

Fujica has a compact, plastic housing, the Fujica Marine-8, for the Fujica AX100 movie camera. The housing has stabilizing wings and a shutter release control. For complete details about this system, look back to our SDM Product Review in the April, 1977 issue.

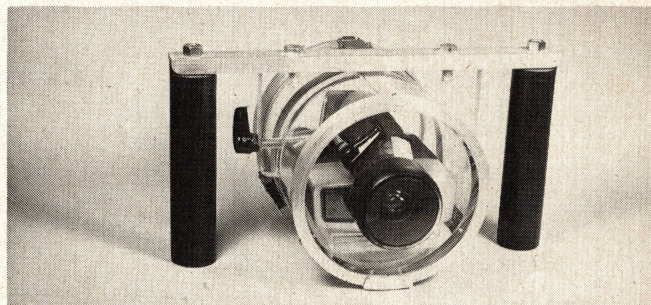
The Elmo Marine TM-1 plastic housing can be used with a wide variety of cameras. It has a cylindrical, plastic body with detachable stabilizing wings and a shutter release control. Counterweights, ranging from 2 to 2.5 kg, can be attached to balance the housed camera for comfortable U/W operation.

### U/W MOVIE LIGHTS

Compact, ni-cad powered movie lights are often used for fill lighting and to restore lost color. The Ikelite modular movie light gives about 12 minutes of light from a fully charged battery module. This is enough to expose three cartridges of super-8 film with a little power to spare. The battery modules are interchangeable and can be recharged in about 15 hours. Brackets are available for attaching one or more modular movie lights to an Ikelite camera housing.

The Oceanic Products movie lights attach to the Oceanic Hydro 8 housing with adjustable, ball-joint arms. The Oceanic PML 100 provides about 24 minutes of light with a recharging time of 16 hours. Model PML 200 can be charged in five hours and gives about 12 to 14 minutes of light.

These small, battery-powered movie lights are usually used for fill lighting with sunlight exposures at camera-to-subject distances of about three feet or more. Although



*The "Green Things" Optical Housing for the Kodak XL camera has an ultra wide-angle optical port. Various models are available.*

the 3400°K color temperature of the movie light would be too red for the daylight filter setting in air, much of the red is absorbed as the light passes through water. Unless you are using Kodak Type G Ektachrome, set the filter for a sunlight exposure. For close-ups, use the tungsten filter setting.

### CHOOSING FILM

We favor Kodak Kodachrome 40 because of its fine grain and warm color rendition. When combined with an XL camera, or standard camera with a fast lens, Kodachrome 40 can be used in many U/W situations without the need for movie lights. In dim light, or when maximum depth of field is desired, try the faster Type G Ektachrome Movie Film. Because Type G film is exposed with the filter switch in the "tungsten" position, the built-in filter isn't used. Thus, Type G Ektachrome is actually two-thirds of a stop faster than Kodak Ektachrome Type A Movie Film. Note: With the Kodak XL cameras, the camera is automatically set to tungsten when the Type G film cartridge is inserted into the camera. Also note: Type G Ektachrome is the only film that can be used with the XL 320, but all the Kodak films can be used with the other models.

If you use a Fujica movie camera, you must use Fujica "single-8" film. Single-8 is the same as super-8 in terms of width, frame size and the size and location of the sprocket holes. It can be projected on any standard super-8 projector. It differs from super-8 in that: (a) single-8 film is one-third thinner than super-8, (b) the film cartridge is thinner, and (c) the cartridge utilizes a pressure plate built into the camera rather than in the cartridge.

Two Fujica single-8 films are available: Fujichrome R25 (ASA 25) for sunlight exposures and Fujichrome RT200 (ASA 200) for tungsten exposures. To use the RT200 for sunlight exposures, use a Type 85 filter. If you can't find the correct size, a larger filter (such as a 58mm) can be slipped in between the



camera lens of the Fujica AX100 camera and the housing port of the Marine-8 U/W housing. Use a little tape to keep the filter from rattling around.

## CLOSE-UP LENSES

You can usually attach close-up lenses to your movie camera. And, because of the excellent depth of field obtained with a fast, super-8 movie lens, you can often film close-ups without movie lights. However, lights will add both color and depth of field because smaller apertures can be used. For example, with a lens set for 8.8mm, focused for four feet, and a Nikon No. 2 close-up lens in place, depth of field is about 13 to 17 inches at f5.6. And at f16, about 11 to 26 inches. Check the depth of field tables in your camera owner's manual.

With most cameras, the close-up lens simply screws into the accessory threads of the camera lens mount. With the Kodak XL cameras, a Series 7, 50.5mm (2 inch) adaptor must be slipped over the lens mount of an XL 33, 320 or 330. With the XL 55, 340, 350 or 360, a Series 7, 47.5mm (1 7/8 inch) adaptor must be used. The close-up lens is then screwed into the Series 7 adaptor.



*Medium-Distance Shot (MS). Diver observes school of small fish.*

## CREATING A MOVIE STORY

A movie story can be a series of individual sequences joined together in a logical order. Each of these sequences — as with the movie story — usually has a beginning, a middle and an end. Three basic methods of filming these are:

1. Changing the camera-to-subject distance. Begin with a long-distance shot (LS) to establish the location. Move in for a medium-distance shot (MS) to identify the individual subject. Then, use a close-up shot (CU) to show the subject or action in greater detail. Another LS — such as the subject swimming away — can be used to end the sequence. The actual camera-to-subject distance for a LS, MS or CU depends on the subject. Three feet could be a LS of a small fish, but could be a MS or even a CU of a diver or other large subject.

2. The subject's actions alone can sometimes show a sequence. For example, a diver feeding a few small fish is suddenly "mobbed" by a school of hungry fish eager for a handout, and swims away to escape. The feeding would be the beginning of the sequence, the mobbing is the middle and the escape is the end.

3. Changes in camera angle are often used in conjunction with changes in camera-to-subject distance to make action sequences more interesting. But be careful not to confuse the viewer as to the direction that the action is moving.

## SWIM-THROUGH SEQUENCES

A swim-through sequence is easy to begin and end. You brace yourself and the camera on the bottom and begin filming. Your model swims into the frame and performs some ac-



*The second Medium-Distance Shot in series. Fish swarm over diver.*

tion — such as picking up and examining a shell — and then swims out of the frame to end the sequence. You stop filming about a second after the subject has left. Such a sequence requires planning: Your model must know exactly what you expect ahead of time. If your model is a fish, you may have to try this over and over again to get the sequence you wish.

## PANNING WITH THE SUBJECT

Panning means moving the camera — from side-to-side, or up and down — to follow a moving subject, or to provide a scenic view of the location. With moving subjects, pan as smoothly as possible. With stationary subjects, pan as little as possible. Fast, jerky panning movements will be painful for your audience to view. Panning can be used to begin, or to end a scene, when no other method is available. To begin a scene, aim the camera at an unimportant area — such as the bottom, or a coral head — begin film, and then pan slowly to the main subject. When the subject is in your viewfinder, stop panning and hold the camera steady. When you have no other way to end a scene, try panning upwards to the exhaust bubbles of your regulator, and then stop filming.

## ZOOMING

Most of your U/W zoom effects will probably be done by moving the camera closer to, or further from, the subject rather than with a zoom control. Zoom in by slowly swimming, diving, or gliding toward your subject. The objective is to film a LS to MS, or MS to CU, in one continuous sequence. Zooming out by moving the camera back further away from the subject can be difficult if you are zooming to a LS. Your fins may kick up sediment or may even show up in your picture if you are using a wide-angle lens.



*The third shot, a Close-Up (CU), shows the diver's view of fish.*



If you have a power zoom and a zoom control on the housing, the problems of body control and camera movement will be greatly reduced because you can hold the camera braced at one position. However, don't overdo zooming effects — a little zooming goes a long way.

### OVERLAPPED ACTION

Overlapped action is used to make a smooth transition from one shot to another. Two scenes are joined together by reshooting the action at the end of the first scene with a different camera angle. For example, film a topside shot of a diver stepping over the side of a boat. Then, film him a second time from below the surface as he breaks through. When these two shots are smoothly edited together, you have a sequence showing his entry from both topside and underwater.

### FILM SOME CUT-AWAYS

Cut-away scenes are short scenes used to break the monotony of longer scenes. They show a quick cut-away from the main action to a related action that is going on at the same time. For example, in a scene showing divers swimming underwater, edit in a cut-away of bubbles rising to the surface,



*The final shot, a Long-Distance Shot (LS), shows diver escaping.*

then back to the divers again. A few short scenes of "fish watching" or an eel slithering into a crevice may not stand well alone, but can make excellent cut-aways. Actually, the swimming divers could be used to give continuity to your colorful, close-up cut-aways, which could be your best footage.

### PREPARING A SCRIPT

A script does not need to be elaborate, but you should at least make a simple list of the scenes you wish to photograph. Here is a sample list:

1. Topside view of a group of divers in a large dive boat.

2. One diver (our subject) steps off the bow into the water.
3. U/W view of the subject breaking through the surface.
4. Subject swims down the anchor line to the bottom.
5. Subject swims along the bottom — stops to observe a small school of fish.
6. Fish swarm over the subject.
7. Subject swims away — some fish follow.
8. Subject returns to anchor line — swims up to boat.

To film this list of events as a short movie story, ask yourself when would you use a: LS, MS, or CU; change in camera angle; swim through sequence; pan; zoom; overlapped action; or cut-away. Assuming that you were going to use two or three cassettes of film, in what order would you film these scenes? You can film in any logical order and edit later.

### SHOW IT TO MUSIC

Before editing your film, try to find some music that will add dynamics and expression to your scenes. Go to a record store and ask if they carry background music for movies and slide shows. Sometimes the musical arrangements to which ice skaters perform can be used as background music for a short movie. While advanced moviemakers will use more sophisticated techniques, a simple recording played with the film can often add that extra touch to your first movies.

### MORE INFORMATION

It is impossible to squeeze in every suitable camera housing into one short lesson, so let us give you some sources of additional information:

1. Aqua-Craft, 3280 Kurtz Street, San Diego, CA 92110: Write for free catalog showing the Green Things Optical Housings for Kodak XL cameras and other dive and photo equipment.
2. Eastman Kodak Consumer Markets Division, Rochester, NY 14650: Send for free brochure describing Kodak XL cameras, and pamphlets: Underwater Movies (30¢), Close-up Movies (10¢), Easy Ways to Make Still and Movie Titles (15¢).
3. Elmo Mfg., 32010 57th Street, Woodside, NY 11510: Write for free brochure about Elmo Marine EM-1 camera housing.
4. Fuji Photo Film, 350 Fifth Avenue, New York, NY 10001: Write for brochure describing the Fujica Single-8 AX100 camera and Fujica Marine-8 camera housing.
5. Ikelite, 3303 N. Illinois St., Indianapolis, IN 46208: Send \$1 for catalog showing movie lights, movie housings and listings of the movie cameras adaptable to Ikelite housings.
6. Oceanic Products, 814 Castro Street, San Leandro, CA 94577: Write for specification sheets describing Hydro 8 movie housing and Oceanic movie lights.
7. Sea Research & Development, 1221 Peppertree Drive, Sarasota, FL 33581: Write for brochures describing movie lights and custom-built housings for super-8 cameras.

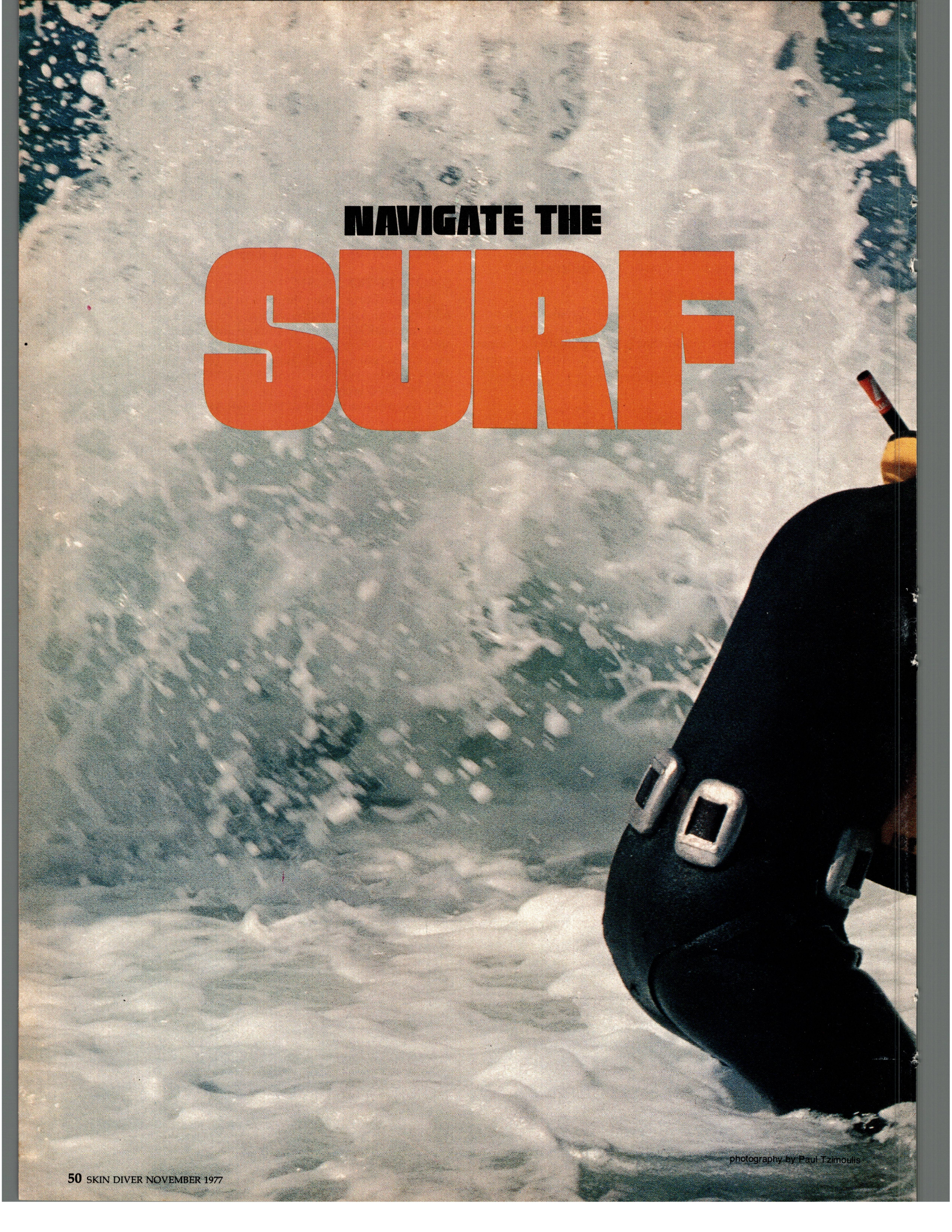
### SUGGESTED ACTIVITIES

1. Using the list of scenes given in this lesson, or a list of your own, build on the basic script by including details: Specify if each shot is a LS, MS or CU, what camera angles are used, and other important details.
2. When the script is finished, decide in what order each scene should be filmed to minimize time and effort.
3. To build on your knowledge of basic techniques, scripting and editing, buy an inexpensive book about above water moviemaking and apply these principles to underwater photography.

### QUESTIONS AND ANSWERS

1. What focal length lens would you need to photograph divers underwater, with a super-8 movie camera?
  2. What focal length lens would be good for photographing smaller subjects, such as fish?
  3. What is the big advantage of a zoom lens?
- ANSWERS: (1) In our opinion, a focal length of 9mm or shorter is needed for scenes showing entire divers clearly. (2) Longer focal lengths, of about 13mm, would be best for smaller subjects. (3) A zoom lens allows you to preset focal length for either large or small subjects.



A close-up photograph of a diver's leg in a black wetsuit, positioned on the right side of the frame. The leg is angled downwards, showing a silver buckle on the strap. The background is a dynamic, high-contrast scene of white water spray and foam, suggesting the diver is in a turbulent or high-speed environment. The overall tone is energetic and adventurous.

# **NAVIGATE THE** **SURF**



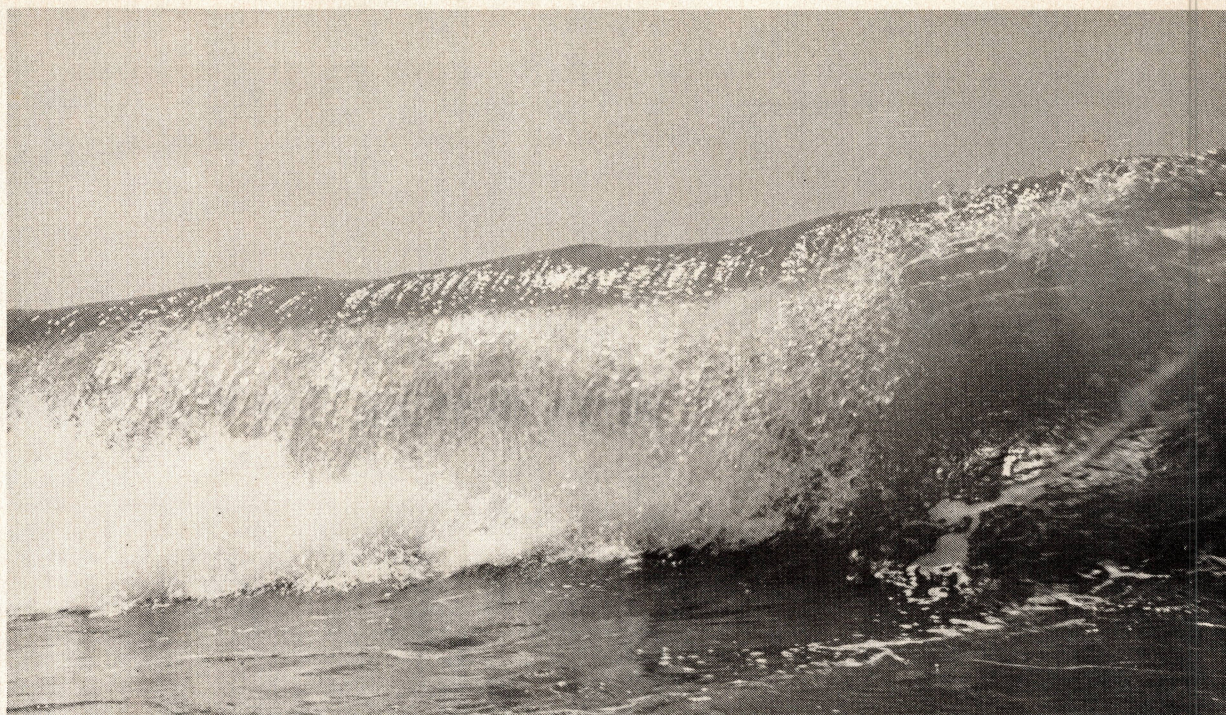


## Learn How To Use Surf Power!

Another heavy wave crashed at my feet as Charles made his way through the surf zone. A moment before I had been in the water with him, urging and pushing his 250 pounds of man and gear through the boiling waves. We adopted this method of beach launch as he is not only the weaker swimmer, but has to carry a larger tank due to his greater air consumption. I strapped on my own tank, pulled on fins and backed into the moving froth turning only to face the largest wave I've ever seen while standing in the sea! The monster fell on me like Niagara. My raised hand expressed defense while thrashing legs tried to get me up and over it. Both met white foam, a place where there was no water and there was no air. Only a froth that I could not navigate, or breathe, and a roar that ran an eon, covered me while scenes from my youth, bits and pieces from one thousand weeks back and two thousand miles away flashed in the whiteness. In a moment I was out, managing to grab a single breath before the next wall of water fell on me printing the image of my belt buckle on the concretion of sand below. A man came to my aid helping me to the limit of the wave's uprush and I plopped on dry sand. The dive was over for me. Charles would soon have to exit without having drawn a single breath from his yellow aluminum cylinder. In this moment of utter defeat I vowed to someday use the power of the surf. I would later learn that the single wave which had flattened me had also expended 50 million horsepower as it struck the entire length of our western coast. There is no

**By Adrian Vance**





*As a wave (above) moves into shallow water, it peaks, becomes unstable and breaks, expending its energy onto the beach. It is extremely important for all divers to time the sets and lulls and check ocean conditions before deciding to enter the water.*

energy shortage at the edge of the sea.

After my disaster, and perhaps for the first time since I had started diving, I sat there and watched the sea. It didn't seem so violent. It was almost calm. A child could enter it with no difficulty, but my strength and spirit were gone. While I sat there doing little more than count my own breaths, the sea climbed up to a high level and several giant waves returned. The surf appeared to be a chaotic place and I would have to know more about it before attempting another beach entry in this place — pure intestinal fortitude wouldn't do it.

I began my research on waves and surf. Pages of volumes passed between my fingers as facts, equations and ideas started to appear in my notebook. Soon a model began to

form: The surface of the sea is an elastic energy transmission system. Waves are usually brought to life by the wind. Each wave is a rolling cylinder of energy passing over the sea at a rate in feet per second equal to 5.12 times the number of seconds between swells. The distance between swells, or crests, of water is defined as the wavelength and the effect of a wave's passing can be detected to a depth equal to one-half the wavelength. When the wave reaches water that has a depth less than one-half its wavelength it begins to slow and its velocity is equal to 5.63 times the square root of the depth. Waves approaching the beach slow until they reach a depth of 1.3 times their height and then they break. Breaking waves collapse into the shore, throwing their energy into the water which rushes up the sand to carve the face of the beach.

If we were to place a spot of dye on a calm sea and view the passing of a single wave, from the side we would see the spot move in a near perfect circle. As the wave approaches the beach, these circles become very much flattened due to the bottom effect that slows the wave. Thus, within every breaking wave there are two pronounced currents. The top is moving toward the beach and at the base there is a current moving out to sea. Research had shown me that the basic motion of the water in a wave generates currents that we can use to navigate the surf.

The literature also stated that waves can meet and mix without interference. A two foot crest can meet a one foot crest and make a three foot product, but if the two are moving in different directions, which is usually the case, they will separate and continue across the sea as individuals, unchanged for their meeting. These crests and troughs of the various wave trains coming from many directions produce the great jumble of waves, wavelets and swells that ultimately become surf. Regardless of how they mix, wave energy is not lost in the open sea and it is only converted in surf when the waves break. My reading indicated that it should be possible to learn the nature of surf's cycles and make predictions of the calm periods and virtually walk into the ocean.

My first attempt to learn the nature of the spectrum of the surf incorporated a one hour recording chart, permitting a notation every ten seconds. Our surf cycles are seldom more rapid than one wave every ten seconds and are usually more like one every 12 or 15 seconds.



*Back in quickly after the wave breaks. As soon as the water is deep enough for you to kick, turn onto your stomach and kick out through the drop zone. Don't stop in drop zone!*



*Hold on to your mask and keep your snorkel in your mouth so a wave doesn't steal it.*



The surf logs indicated certain things about surf: The calmest period for any surf cycle appears shortly after a period of high activity. It is as if the sea works itself into a frenzy, throws its big ones and then takes a rest. The period of great activity is usually punctuated by three or four large waves, but this number varies and can change from cycle to cycle. However, after the high cycle, the sea will appear to recede quite markedly, then return to the level of that time and tide. The breakers that appear during this period will be small and the sea level will hover around this point for one to several minutes before it begins to climb. When it reaches its highest level the big breaker activity cycle will begin momentarily. In some cases the high cycle will be preceded by a dramatic fall in the apparent level. However, the fact that the big waves have not appeared means that they are coming, in spades. Most of the divers who are injured or thrown back in strong surf have probably entered in one of these periods when the sea was, in effect, cocking itself to go off. The surface can look deceptively calm when it does this, but all at once a large lump appears in the distance, swells up and becomes the biggest wave you've ever seen.

In general the characteristics of surf are: (a) a full cycle of five to 20 minutes with 10 to 12 being typical, (b) peak periods including three or four large waves, (c) a distinct drop in the level of the sea, but a quick return to the level for that hour and (d) a calm period of one to five minutes.

A calm period of one minute may not sound like much, but a typical diver can swim at four feet per second in a full scuba outfit. The surf zone on a day where the breakers vary from one to three feet will only be 26 feet wide on a typical beach with a bottom slope of 10 percent. Five foot waves are probably the diver's limit and on a day when the surf varies from two to five feet the surf zone is still only 39 feet wide on the same 10 percent slope beach. In the first case the diver should be through the surf zone in 6.5 seconds and in the latter, 9.5 seconds. And, with even the most rudimentary timing system it should be possible to avoid the peak waves. But, if you make a mistake, there is one maneuver that you can perform to get through a breaker very quickly.

When a diver finds himself in front of a breaking wave, his first inclination is to rise up and get on top of it, but this is exactly the wrong thing to do. Remember, a wave is a rolling



*Rocky entries can be tricky. It is important to relax and work with the water. Let the backwash carry you over and around rocks.*

cylinder of energy. The top is moving toward you and the base contains a current that is moving out to sea. Dive into the base of the wave and you will not only avoid being pushed back to shore, but will also be swept seaward! In a typical three foot breaker the top is moving toward shore at 11 feet per second and the seaward current in its base is moving out to sea at much the same rate. There is a slight difference due to the geometry of the wave, but in some beach situations, as well as some surf cycles, the added downrush current can make this wave base current a real people mover. These facts mean that you have to enter the sea either neutral or negative and never with your vest fully blown up. This will sound crazy to a lot of divers, but if you spend some time observing surfers you will find that this is exactly what they do on their way out. Surfers dive into a wave that is rolling toward them and they are not only through it in a flash, but farther out to sea as well.



Coming out of the sea is much the same problem in reverse, but making the timing observations is complicated by the fact that you are in the water and cannot see any great distance. However, as you approach the surf zone you will notice that the swells are more pronounced, lifting you quite noticeably as each passes. These waves are being slowed by the bottom effect and they are piling up as they prepare to break. When you are coming in, watch the uprush of the breaking waves and the behavior of people at the water's edge. During the high cycle they will usually run above the wet/dry sand line and when the level falls markedly, indicating the arrival of the calm period, they will run down to the water's edge. The approaching diver will usually have a velocity of something on the order of two feet per second and will be returning from a point 1000 feet out. Eight minutes will be required to cover the distance, thus is it possible for the diver to miss the peak cycle and come out in very heavy surf. Inasmuch as the calm period is normally seen soon after the peak cycle, the returning diver will have to hold his position just outside the surf zone and wait for it. However, exits are much easier than entries in spite of the fact that you are tired, towing game and swimming with a fully inflated vest. The natural currents on the tops of the waves will push you out of the ocean and even though you may be very busy, it is much easier to get out in the direction of the surf action than it is to be fighting it.

If the surf is wild and you want to make the easiest possible exit, the timing process must begin long before you swim back to the surf zone. Otherwise, you will have to hold off until the big waves have passed. In timing the surf for your entry you have found the basic cycle, which may be 12 minutes, for example. This basic cycle will not change much in the two or three hours you may be diving, but it should be timed nonetheless. Hypothetically, then, if you observe a peak cycle at 3:10 p.m., another will appear at 3:22 and you will probably want to be exiting a minute or so after that. Or, a minute or so after 3:34, 3:46, etc. Time your return so you have a few minutes to hold off, rest and prepare for the trip through the surf zone. If you pause at the 100 foot distance you will be able to feel the swells quite well, as they are piled up and about to break, the expected three or four big ones will pass without your missing them and then a noticeable calm period will follow. This is the time to make your landing.

Before making a run for it, it is a good idea to look back carefully and see if you can observe yet another swell coming into shore. From your position on the edge of the surf zone, the undulations of the sea are easily seen and somewhat magnified. If there is no water lump moving toward you, the calm period has arrived and you should be able to paddle out of the Pacific as if it were a puddle. And, remember that the 100 foot

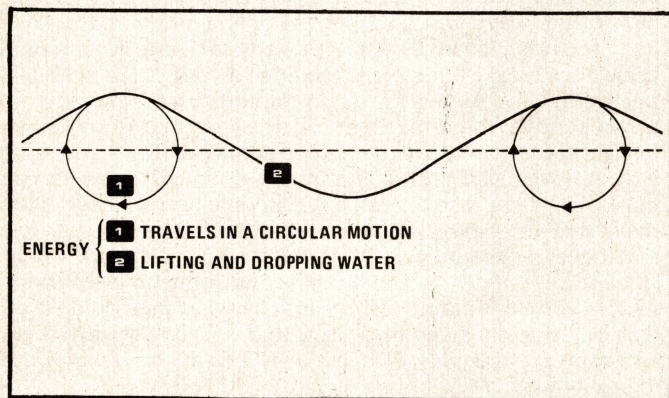


*Time your exit as well as your entry. Returning to the beach after your dive, pause before you enter the drop zone. Watch the horizon to see if another swell is approaching. Wait for the set to pass, then move quickly toward shore. If you find yourself in the way of a breaking wave (right), dive under it. Surf entries and exits are easier if you use the power of the water to your advantage. Work with the water, not against it.*

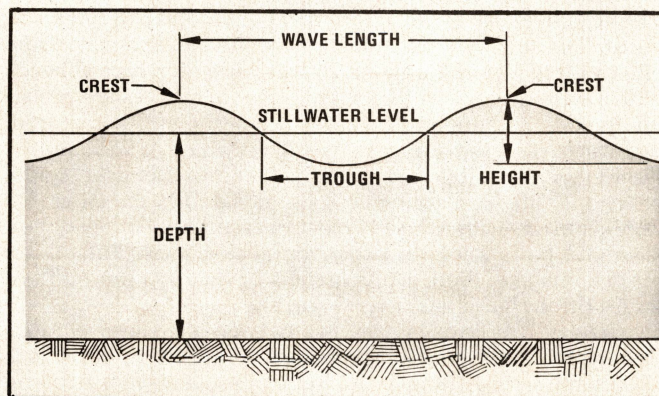
holding distance is a very good one because a wave would have to be 7.5 feet tall to break there, assuming the typical bottom slope of 10 percent. Swells passing under you will send their breaker's uprush up the sand slope in a little over eight seconds after they pass under you. This is one way that you can find the 100 foot distance: Count the number of seconds between the swell passing by "zero thousand, one thousand, two thousand," and so on to "eight thousand" and you should see that breaker's uprush racing up the sand.

The shorter the interval between the time a swell passes under you and you hear it breaking, the larger the wave. A five foot wave breaks in 3.5 seconds after passing you 100 feet out from shore, but a three foot wave breaks in five seconds and a one footer in five and one-half seconds. These differences are significant enough that you should note the passing of the high surf activity period and the beginning of the relative calm period with accuracy. After resting for even a few minutes you should be able to swim through the surf zone at full speed covering the entire 100 foot distance in 25 seconds (excluding other phenomena like: holes, longshore currents, etc.). If the breakers are hitting the beach every ten seconds and you hear them begin their break five seconds, or more, after they pass under you, leave your holding position five

*If we place a spot of dye on a calm sea and view the passing of a single wave, from the side we would see the spot move in a circle.*



*Each wave is a rolling cylinder of energy usually brought to life by the wind. The distance between swells (crests) is a wavelength.*



Illustrations from the Jeppesen SPORT DIVER MANUAL





seconds after the next swell passes. You will then be 80 feet out when the next wave breaks anywhere from 13 to 39 feet out. The next 10 seconds of swimming will put you right behind the next breaking wave, in a little less than four feet of water. You should be able to stand and back out after a few more strokes and before the next breaker hits you.

Generally it is not a good idea to make an entry or an exit in a rocky area where waves are breaking. But, there is one exception to this rule. On some beaches which are otherwise nothing but sand, you will occasionally find one large rock or a reef that comes out of the sea and onto the beach. Seldom ever does the surf come straight into the beach, as it usually has a dominant source either to the right or left. Notice on which side the surf is breaking first and enter on the other side, near the rock, using it as a screen. When you are making your exit, be sure to study the surf and confirm that the waves are still breaking on the same side first. One side of that rock will be a very different surf environment than the other.

There are a few beaches where the rocks are very large and stacked like a pile of tumbled children's blocks. In some of these places there is no surf since the faces of the rocks reflect the wave energy back out to sea. Making entries in these locations can be tricky as the water washes over the algae-covered rocks making them super slippery. But the sea seldom moves up and down faster than half a foot per second and, if you can stay upright, these rockpile beaches are easy to enter.

Now when Charles and I arrive at a beach dive site, our preparations include watching and listening to the surf. When those three or four monsters crash on the sand and other divers start repacking their bags, we set the rotating bezels of our dive watches and continue dressing. In the half hour that it may take us to get ready we will usually see two full cycles and be at the edge of the water for the peak of the third. When the expected monsters crash, we nod in confirmation and count the big ones. Now the sea runs away from us, but soon returns to the tide level and small waves break in the surf zone. The window to this day of beach diving has opened and we swim through it.

*Turn sideways to the waves (above right). This creates less surface area for the wave to hit. Never take your mask off on the way in. Wait till you reach dry sand.*



*Lean forward and let the wave action help you back in (above right). If you should fall in the surf zone, do not attempt to stand up again. It is safer to crawl out on your hands and knees.*



# freshwater diving

Inland lakes have more to offer  
than meets the eye

By Gary Chesnut

Picture yourself sliding into that delightfully warm 80 degree water, offering a visibility of 80 feet or more, with a circus of color exploding before your eyes at each turn of the head, and you immediately know that I'm not talking about a Midwest freshwater dive! Counter that with, hopefully, 10 foot visibility, 50 degree water, and the dual-chromatic green-yellow environment, and you quickly understand one of the reasons why a freshwater diver often loses interest in local diving after his first Caribbean dive trip. For the first time in his life, outside of his pool instruction, he has a variety of interesting visual subjects to command his attention, all of them more interesting than the brown mud bottom typical of freshwater diving.

Immediately, plans start formulating for that next saltwater dive trip and you realize the need to start learning something about all those beautiful creatures you'll be seeing. You're hooked! So now freshwater diving quickly becomes something you do only to keep in shape for the next dive trip — just to get wet, or, to check out new divers entering your sport. Your interest is gone. You continue on, sometimes not even knowing why you still dive under these conditions, and wondering when you will become a part of the "quit diving" statistic that plagues your sport.

But, if you are lucky, just before you finally drop out, something will happen to regenerate your interest in Midwest diving — something as simple as a suggestion that you should photograph more freshwater subjects. Well, that simple suggestion came from my wife, and it started me thinking. I have literally thousands of slides of saltwater creatures and a good working knowledge of many of the creatures I come across, but I know absolutely nothing about the freshwater habitat, and I have less than 50 slides from local Midwest dive sites. A major portion of my fun in saltwater diving stems directly from knowledge of the creatures there, and that same curiosity and study applied to local diving may well increase my enjoyment of freshwater. With that in mind, I chose Pearl Lake, just an hour away from my home in Sycamore, Illinois, for my photographic study. My approach would be to find an interesting subject, photograph it, and then find out something about it.

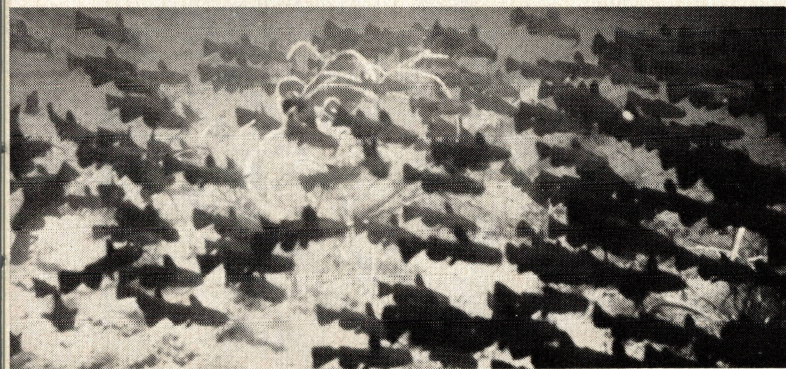
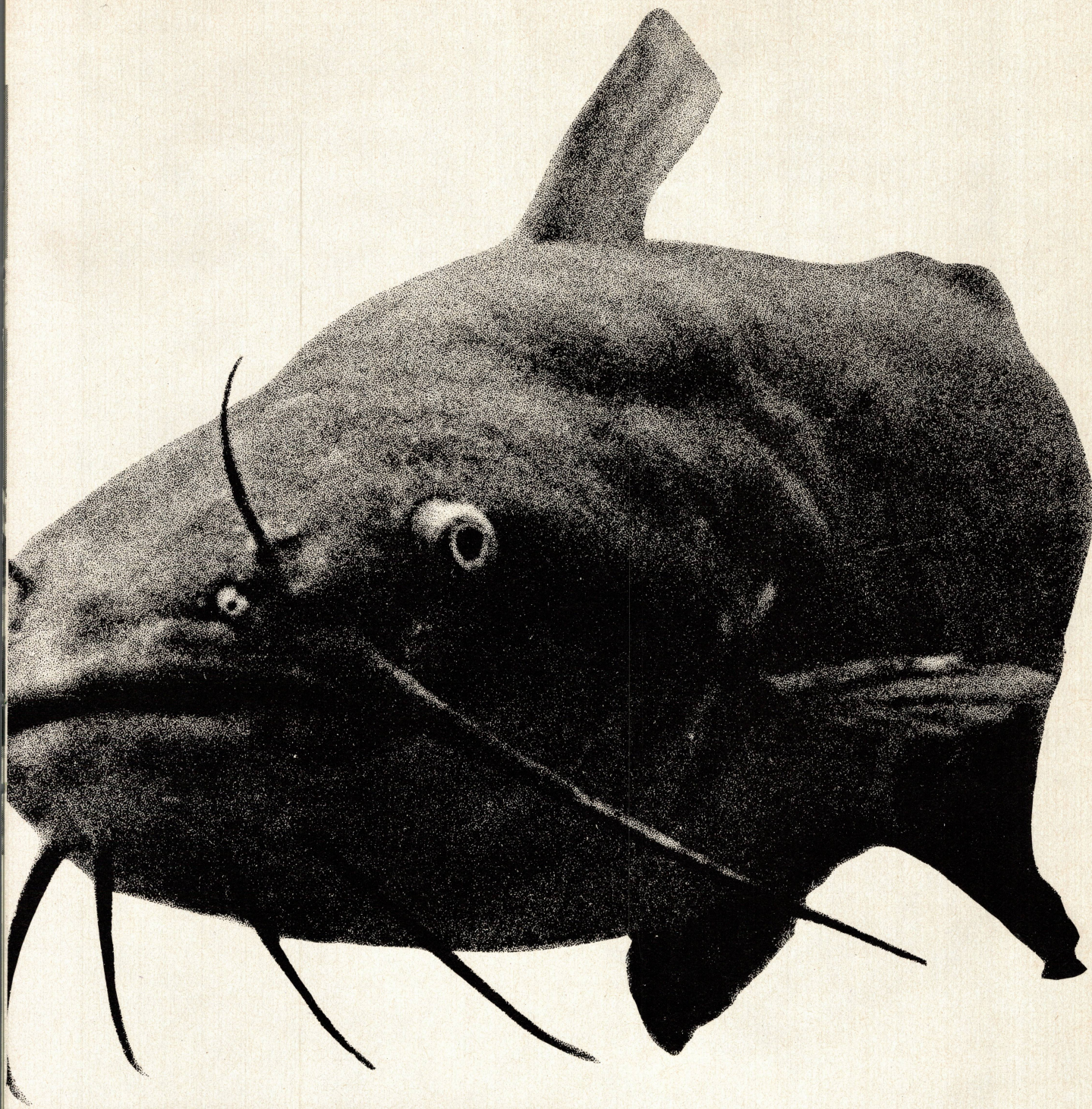
My first dive was in early July and I found a subject within a few minutes. There, lying on the bottom, was a yellow bullhead, a fish almost everyone recognizes. He was unusually cooperative as I moved in, hoping to get close enough for that one shot before he sped off. With camera and strobe preset, I swam close, making small focus adjustments, and when all was ready, I tripped the shutter for that one shot. But to my surprise, he didn't leave the grass bed. I realized why immediately. He was protecting eggs, literally thousands of little yellow eggs, massed together. Occasionally, he would stir above them and I later found out that he was fanning the eggs to oxygenate them. Bull heads, with their cat-like whiskers on both flattened jaws, seek protected sites near logs or rock ledges to spawn, usually in 18 inches to 4 feet of water, in late May or early June. The 2000 to 7000 eggs are protected vigorously by the male until hatching, which usually occurs in five to ten days. I spent about 20 minutes observing and photographing this bull head before moving on.

A few minutes later, I spotted a second bullhead slowly swimming over the bottom. I preset my camera and was moving in when I noticed the black mass of hundreds of baby bullheads huddled together. They were scarcely a half-inch long. The adult would ward off predators who took turns darting in for a feast before being chased off. During the unguarded moments, the dense school of free-swimming juveniles was being systematically reduced, with each predator taking his turn at luring the protecting male away while others darted in to feed during his absence. The young of the species are usually protected until late July or August.

The lake was full of all kinds of catfish that week, from yellow bullheads (*Ictalurus natalis*), brown bullhead (*Ictalurus nebulosus*), to channel catfish (*Ictalurus punctatus*), and all were in various stages of preparing shallow depressions in the weed beds or near a sunken log, guarding the embryos and occasionally fanning them, or guarding the dense schools of newly

(Continued on Page 68)





photography by Author

*Bullheads, with their cat-like whiskers, seek protected sites near logs or rock ledges to spawn. The male vigorously protects the eggs until hatching occurs in late spring. Hundreds of baby bullheads (left) huddle together as the adult male wards off predators. During unguarded moments, predators move in to systematically reduce the dense school of free-swimming juveniles. The young are protected until mid-summer.*







# Meet Pop Taylor

## Florida's Pied Piper of Diving By Bill Barada

Standing on the banks of the spring-fed Rainbow River near the little town of Dunellon, Florida, I was introduced to a dive program that, to my knowledge, is unique to the United States and perhaps to the world. There were 12 people in the group, but six of the divers gearing up to enter the water with scuba were so young — 10 to 15 years old — it appeared that the traditional concept of 16 as the minimum age for safe scuba diving was being violated. By the end of the day, however, my apprehensions had been put to rest. The kids dived in pairs and each pair was accompanied by an experienced adult who was either a veteran diver or an instructor. The kids displayed underwater skills and watermanship that would put many adult divers to shame. They were typical of Florida's Underwater Scouts.

What makes this teenage program unique, however, is that it is not just another basic training program for junior skin divers. The primary interest of its leaders, and the kids, is underwater archaeology, and their activities have evolved into an educational program and a community service that has attracted the attention and respect of high schools, junior colleges, civic organizations, museums and business leaders. At present it is still a spontaneous, local movement. It has absolutely no affiliation or connection with the nationally recognized Boy Scouts of America, — however, in this writer's opinion, the Underwater Scouts idea has a similar potential to spread across the nation with tremendous implications of future benefits to diving.

As with virtually all worthwhile movements, the Underwater Scouts began as the brainchild of one person and its success over the years is due entirely to his enthusiasm and dedication. That person is Calvin Taylor, Florida's oldest diver, who is now in his late 60's but still one of diving's most active and enthusiastic participants. "Pops" Taylor, as he is affection-

ately known among Florida divers, began his underwater explorations in 1953, at a time when he says, "Everybody was spearfish crazy. All they wanted to do was shoot fish." Pop says, "I shot one — one time. But I didn't like it and started looking for something else to do."

Underwater archaeology came as naturally to Pop as his nickname. He is a native Floridian who represents six generations of Taylors in Tampa. He has a Southerner's pride in his heritage and "artifact hunting" as he calls it, gave him an opportunity to contribute something worthwhile to the state's knowledge of its history.

His attitude is best expressed in his own words. Pop says, "I guess a lot of

people think we're nuts groping around in the mud on the bottom of a river when we could be enjoying the clear water in the Keys. Our artifacts may look like a bunch of old junk to some people, but to us, they are more valuable than gold or silver. "Where else," he asks, "can you find things that tell you what the animals were like a million years ago — or how the Indians lived 10,000 years ago? If you are a Southerner, like me, a Confederate shipwreck at the bottom of a river, or Confederate weapons and equipment used in the War Between the States means more than finding a Spanish galleon or treasure in the Caribbean."

Pop formed a group known as the Florida Marine Archaeology Divers



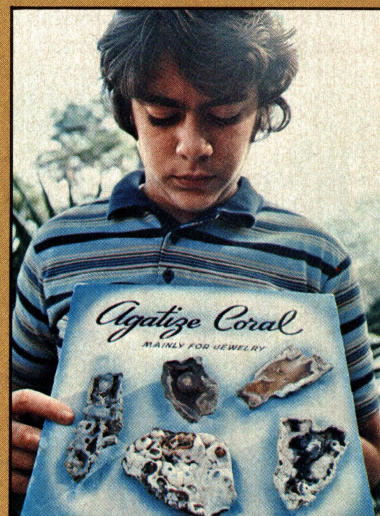
photography by Author



Jessica Smith



Timmy Taylor



Buster Castellano



which adopted the motto "To Enjoy, Not Destroy." Its members spent their weekends looking for historical and pre-historical relics buried in Florida's rivers and lakes. Working with museums, professional paleontologists and archaeologists, they accumulated a tremendous knowledge and developed unique skills at finding artifacts and interpreting their historical significance.

The Underwater Scouts developed as naturally and spontaneously as the rest of the program. Pop has three generations of Taylors diving with him. His children, and now their teenage children, share his enthusiasm for "groping around in the mud at the bottom of rivers." Other divers brought their kids along on weekend outings, or sent them along with Pop when they couldn't go. The word spread, other kids asked to go along, and the teenage — Underwater Scout — program began to take shape.

By October, 1976, Pop had personally taught 1070 kids how to dive for artifacts; another 17 were on his "acceptable list." The program was spreading rapidly. Many of Pop's former scouts return as adult divers — particularly to help with the kids, but primarily because they are still "hooked" on underwater archaeology and want to join Pop in looking for more artifacts.

Pop Taylor is more than willing to share his knowledge with adult divers, but his first love is for the kids. He says, "The kids are too young to go diving on their own, they are not old enough to drive a car, and if their parents are not divers, or not interested in diving, the kids are out of luck." He tries to talk the parents into going along, and tries to get them interested in diving. But many are not physically capable of diving — and a lot more simply don't care. Pop says his experience shows that, "If you wait until a kid is 18 before introducing him to diving you usually are too late. By that time they usually have wheels; the boys are too interested in bikinis, and the girls in muscles, to be bothered with subjects such as scuba and artifacts." Pop says you must catch the kids while they are still young enough to be interested and while they still want to know.

Paul Ledbetter, a Florida diving instructor with 12 years teaching experience agrees with Pop. He teaches scuba to youngsters 12 through 15, according to national standards which require that a parent go through the complete course with the kids. He says that too many times the parents are not really interested, or not physically suited for diving, and asks, "Should kids be denied an opportunity to learn about scuba if their parents are not divers?" He believes that Pop Taylor's Underwater Scout program fills this gap. The kids get a complete basic course in diving, in-

cluding water training in a pool, but are not given a certification and they dive only under the supervision of an experienced adult. Paul says he has absolutely no hesitation in letting his own youngsters go on a dive trip with Pop Taylor and the scouts when he is tied up and can't make the trip himself.

Pop has developed an effective system for weeding out the kids that goof off, or are not seriously interested. In order to qualify for the program a youngster must accompany the group on five dive trips. Once or twice is not enough. After five outings, his name goes on a permanent record as having enough interest to warrant the time and effort required to teach him the skills of diving and artifact hunting. The youngsters begin with snorkeling and advance to scuba as their proficiency warrants. When an artifact hunting trip is planned, the eligible scouts are selected from the permanent list. Parents and instructors help provide transportation.

Pop's method of teaching is also unique. The youngsters naturally jump at the chance to go on a trip into Florida's wild country which is some of the most scenic in the nation, so getting volunteers to go along on scouting trips is no problem. But helping them to develop an interest and an understanding of such seemingly dull and complex subjects as archaeology and paleontology is a different problem. Pop's method is so successful, and so simple, that the kids eat it up — and the museums, and school teachers love it.

I watched it work on our Rainbow River outing. One of his grandsons, 15 year-old Ronnie Taylor, dug up a piece of something that, to me, looked like nothing more than a small, discolored and waterlogged twig. He showed it to Pop, who said it was the fossilized toe bone of a giant sloth. Pop described the sloth as a huge animal, about 25 feet tall and weighing around 12,000 pounds, that lived in Florida during the Ice Age, perhaps a million years ago. He told Ronnie and the other kids that this animal's scientific name is *Megathere* and the time during which it and other huge animals roamed over Florida is called the Pleistocene Epoch.

Each scout who "discovered" something unusual was given a similar thumbnail history of their find. Most objects the kids brought to the surface on their own were modern "rubbish" such as pieces of glass, metal, rocks, or wood. But even these were closely scrutinized by Pop and the identifying features carefully pointed out.

A few weeks later, in a "presentation" at Pop Taylor's home in Tampa, each youngster who had found something worthwhile was given a plaque with the artifact mounted on it. The

plaque also had a picture of the animal or object, and a brief history of where it lived and how it lived, the date and location of the discovery, and the name of the person who made the find.

Pop takes all artifacts to the State Museum in Gainesville where paleontologist, Dr. David W. Webb, verifies the identification and presents Pop with a photographic reproduction of the animal — or an artist's conception of the setting if it is an Indian arrowhead, cooking utensil, or similar relic.

Thus, each Underwater Scout has a permanent record and history of his find which he can show to friends — and to classes at school. As a scout's collection grows, the best items are selected and consolidated into a single plaque to illustrate and recognize his prowess.

What was particularly interesting to me is that each youngster develops his own specialty and concentrates his collecting and efforts in this field. The variety of specialties and the knowledge of their subject these youngsters acquire is amazing. The six teenagers who went on the Rainbow River artifact hunt are an excellent example.

The youngest member was 10½ year-old Jessica Smith. She and her 13 year-old brother, John, were under the supervision of veteran diver Jim Bedsaul. Jessica began diving with mask, fins and snorkel when she was seven and has just recently taken up scuba. She can hold her breath underwater for more than one minute, is proficient in all basic dive skills and her specialty is shells. Jessica knows that Florida was once submerged beneath the ocean and that she can find fossils of ancient sea creatures such as giant sharks, sea turtles and shellfish, as well as freshwater shells, on the bottom of Florida's rivers. Jessica says, "I haven't found much yet, but I want to become a shell collector."

Jessica's brother, John, specializes in Indian relics. He knows that the ancient Indians hunted prehistoric animals with crude weapons and that arrowheads, spearpoints, axes, and similar artifacts can be found at "kill-sites" where humans could safely confront these monsters. He also knows that the Indians fashioned their weapons with other hand-made tools, cooked in pottery made from clay or solid wood, and moved over the water in dugout canoes.

Buster Castellano, also 13, and his brother, Nelson, were supervised by diving instructor Paul Ledbetter. Nelson verified Pop's opinion of 18 year-olds. He admitted he was "just along for the ride" and is more interested in hunting bikinis than artifacts. Buster, however, is a rock hound. He likes rocks of all kinds, but is partial to colored rocks. He told me that kaopetate is rock, that chert is pure white salt, that fossils are a



mold of an "ossified" animal and are found in limerock, that fossilized corals are beautiful, that quartz weapons were made by ancient Indians, and that the Blue Grotto (Florida) has the best selection of quartz weapons he has seen.

Ronnie Taylor, 15, specializes in prehistoric animal fossils. He knows that the ocean was once much lower than it is today and that ice-age glaciers drove hordes of huge animals into Florida from the north. He knows that the ocean again flooded the land and that Florida became a vast graveyard for now extinct animals such as saber-tooth tigers, mammoths, mastodons, sloths, bears, wolves, and horses. He likes searching for their fossilized remains in the bottom of rivers, lakes and sink holes.

Larry Taylor, 14, goes for coins — all kinds of coins — new or old. His primary interest now is the money, and while the others are looking for rocks, bones and arrowheads, Larry is usually under a dock, bridge or diving board looking for lost coins. He has a substantial collection already and hopes to try treasure-hunting when he gets older.

Timmy Taylor, Pop's third grandson, is a chip off the old block in that his preference is shipwrecks. He loves to dive on the wrecks of the *Kate Dale* and the *Scottish Chief*, Confederate ships sunk in the Hillsborough River by Union troops during the Civil War. Timmy is especially proud of a 100 year-old knife, a machette, and an old holepunch he found on these wrecks. He also likes to dive the wreck of *The Shorne*, a 60 x 20 foot coal burner sunk in Crystal River. Timmy says you can still find coal inside the ship and the wreck's so old that most of the nails in it are square. Only a few divers in Florida know this wreck exists.

These are only a few of the specialized fields that can be developed into an exciting and rewarding underwater hobby. Others are old bottles, glassware, pottery, woodcraft, objects of the 18th and 19th century, and anything else that might shed light on a segment of early American history.

The interest of the average diver and the general public in underwater artifacts and the implications of this interest for dive shops and diving instructors across the nation is generally not recognized. As an example, it is estimated that 80 percent of Florida's divers spend at least part of their underwater time looking for artifacts, and the more they learn about it the more fascinated they become. This is illustrated by the demand for Pop's services in lecturing and putting on displays at schools, colleges, civic functions, dive clubs and even at museums. He says the adults love it and the demand is so great he can't possibly accept all of the invitations. The Florida Skin Divers Association, Inc. has estab-

lished an underwater artifacts committee with Pop Taylor as chairman. He writes a regular artifacts column in the FSDA Bulletin and his work is recognized and respected by the Florida State Museum, the Tampa Museum, and teachers from Jacksonville to Miami.

Part of the reason for the increasing diver interest in artifacts is expressed by Paul M. Lien, an enthusiast whose 13 year-old son often joins Pop on scouting excursions. Paul says, "Diving, to some of us, has become more than just an en-

groups. Such cooperation is essential: The professional knowledge and guidance of museums and historical societies is the source of information that sets amateur archaeologists and artifact hunters above the ordinary scavengers and souvenir hunters.

Your local or state museum is the place to start. The director of the Florida State museum in Gainesville said that 90 percent of its artifacts were donated by private collectors, which is another term for artifact hunters. ➤



photograph by Author

joyable sport to partake of in our leisure time. It has become a mode of transportation and a way for us to link ourselves back into the past. Locating artifacts from colonial and prehistoric times has grown into a full time interest to me. Trying to find those ever-elusive big game kill-sites and ancient fossil beds that nature has so cleverly hidden in her river and lake bottoms, has become more and more challenging."

The significance of this for divers all across the nation is that historical artifacts exist in virtually all inland and coastal waters. Artifact hunting should be particularly appealing to inland divers because wooden objects are preserved in fresh water and this hobby would give dive clubs, instructors, and other groups something to do other than spearing rough fish. The beauty of artifact hunting is that you don't need clear water. Most of Florida's artifacts are recovered from black water, and many have a dollar value similar to antiques.

Another inducement for divers to take up artifact hunting is that local diving may become more and more important if the energy crisis becomes severe.

This is especially true if the diving is conducted as an educational program for teenagers along the lines of Pop Taylor's Underwater Scouts. School teachers, museum personnel and civic leaders are delighted with such a program and their support is assured to dive groups who work with these



*Florida's young diver-archaeologists spend their weekends looking for historical and prehistorical relics buried in nearby rivers and lakes. They have accumulated a tremendous amount of knowledge and have developed unique skills at finding and identifying artifacts and interpreting their significance. Each young diver is accompanied by an adult diver.*



# They'd Rather Switch

## Sherwood Selpac Switches to New O-ring Valve Design

BY JOHN M. WALSH

**T**oo often the only time a diver may look at a valve O-ring is when it pops out of the groove in the tank valve and gets lost in the sand. Of course, wearable, replaceable O-rings should be the subject of regular inspection, but too often this inspection doesn't take place.

Now, with higher tank pressures becoming the reality, rather than the dream of divers who want to stay down longer, the conventional O-ring ought to "get lost" for another reason, at least in the opinion of one manufacturer of scuba gear, Sherwood Selpac.

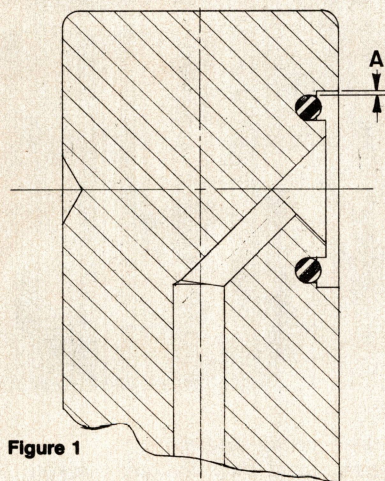


Figure 1

Figure 1 shows a cross section of the traditional CGA 1310 connection. The O-ring is shown in place with pressure applied by metal surfaces and air pressure.

### WHY USE AN O-RING

Before looking at the reasons why Sherwood favors the smaller CGA 850 design, a little look at O-rings in general is in order.

First of all, the only reason an O-ring is used at all is to form an air-tight seal between the tank valve and the first

stage regulator. When you think of it, it's really a moving part, held in place only by the air pressure from the tank and the metal surfaces of the regulator and tank valve that contact it.

The ability of the O-ring to do its job can be hampered by wear on the metal

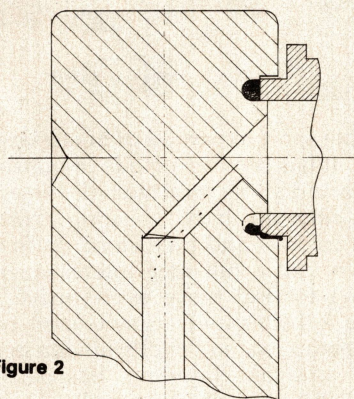


Figure 2

Figure 2 shows the O-ring forced by high pressure air to extrude through the space created by a worn-out metal-to-metal contact area between valve and regulator.

valve and regulator contact surfaces, and air pressure that's too great for the O-ring and the opening it fills. Routine wear and high pressure can often cause O-ring extrusion, which could be a disaster if it occurs underwater.

### METAL-TO-METAL CONTACT

As stated before, the O-ring is held by metal surfaces on the valve and regulator, and by air pressure. The higher the air pressure, the more important the condition of the metal surfaces becomes.

Note that the "A" dimension, that is the actual metal-to-metal contact area between valve and regulator, is very small. It actually measures between .008" and .013" in typical valve-regulator connections. This small area

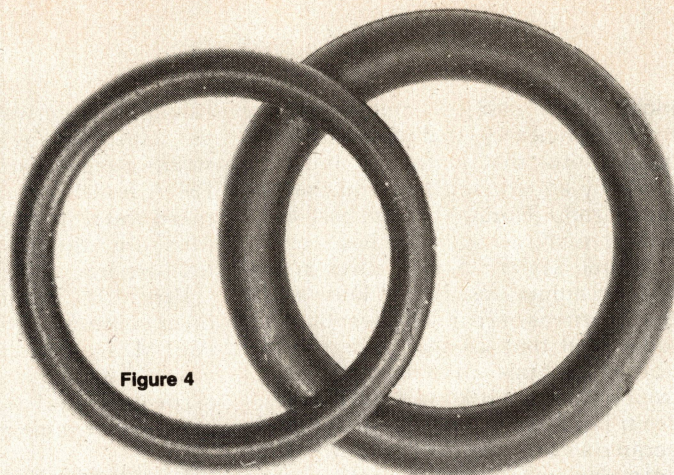


Figure 4

Figure 4 shows a size comparison between the CGA 1310 O-ring and the CGA 850 O-ring. Notice that the CGA 850 is smaller.

gradually deteriorates through use, especially at the edge of the regulator, which becomes rounded.

Eventually, the condition shown in Figures 2 and 2A can occur. The new CGA 850 connection, shown in Figure 3, has a much larger metal-to-metal con-

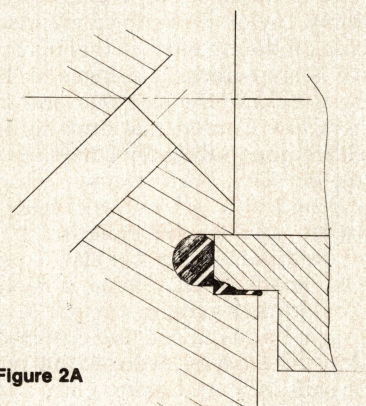


Figure 2A

Figure 2A (above) is a detail of Figure 2. Once the O-ring ruptures, air is rapidly lost into the water or ambient air, rendering the regulator useless to the diver.

tact area. This makes it stronger and less likely to wear to a point where the O-ring can extrude out of the connection.

### A SMALL O-RING FOR BIGGER PRESSURES

In addition to the metal surfaces that contain the O-ring, air pressure contributes its own holding force. And the higher the pressure, the more important that force becomes.

Even after purging, it is possible for high pressure air to become trapped in the valve groove under the O-ring. Depending on the amount of air trapped, this condition can create results ranging from the inconvenience of an O-ring popping out and losing itself on a sandy beach, to a full tank pressure trapped under the O-ring so that it's virtually impossible to loosen the yoke screw.



The new CGA 850 connection has an O-ring design that ends the popping O-ring and stuck yoke screw alike.

It also installs in valve groove with a slight O.D. squeeze, leaving a small, but very important space between the O-

ring I.D. and the O-ring groove. This space prevents high pressure air from becoming trapped under the O-ring by giving it a place to vent. The smaller O-ring also reduces the force exerted on the yoke when the system is under pres-

sure. Finally, the O-ring is easily replaced without the risk of damage to the vital outer sealing surface of the groove.

### PICK THE RIGHT SIZE O-RING

The benefits of the CGA 850 connection can be lost if the wrong size O-ring is used. Because of the flexibility of the rubber O-ring, it is possible to force a larger O-ring into the smaller CGA 850 groove. But, this may prevent the vital metal-to-metal contact the new connection makes possible (figure 5). The leading edge of such an O-ring will begin to develop worn spots and tearing. The O-ring seals for awhile, but eventually and permanently will fail.

### CONNECTION COMPATIBILITY

Does this new CGA 850 connection mean you have to kiss your favorite regulator goodbye? Not at all. There is complete compatibility between the new CGA 850 connection and existing regulators, and more and more manufacturers are moving toward it. In fact, the CGA (Compressed Gas Association) is recommending a five-year phase-out period during which the old CGA 1310 connection will be slowly replaced by the CGA 850. 🐸

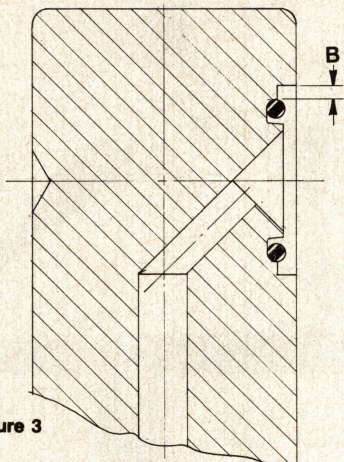


Figure 3

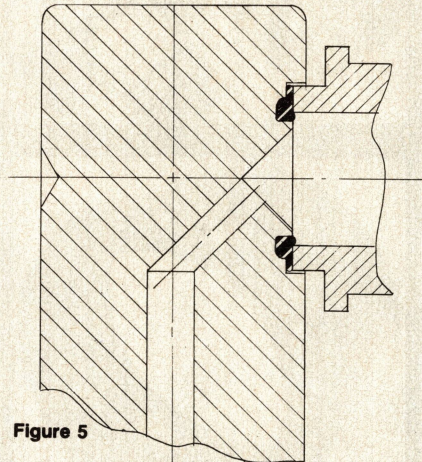


Figure 5

The area marked "B" in Figure 3 (above) shows the metal-to-metal contact area in the new CGA 850 connection, which is five times larger than the CGA 1310 area.

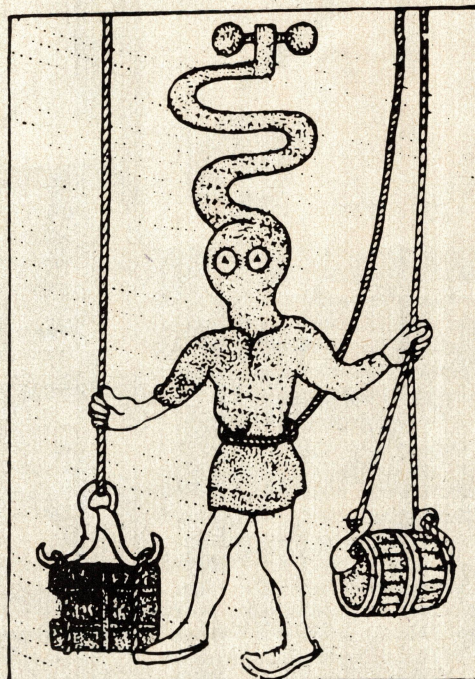
Figure 5 shows what can happen when the larger O-ring is used. When regulator and valve are joined, the O-ring may extrude out of the slot and into the contact area.

## STRANGER IN TOWN?

**N**o matter where you move, there is good diving and the best way to find out about it is from a pro dive store. You can get the scoop on new buddies, clubs and party dives the moment you walk through the door. If you are a stranger in town, make the closest pro dive store your first stop.

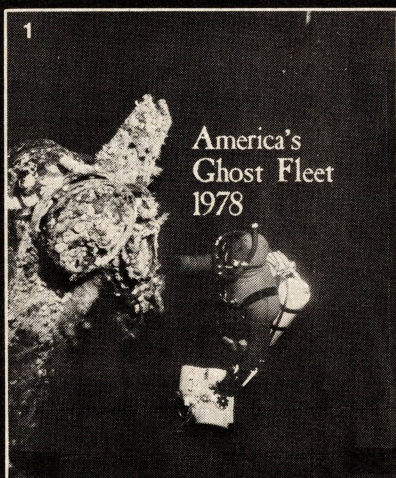
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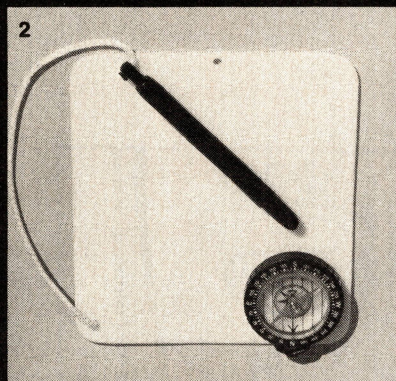




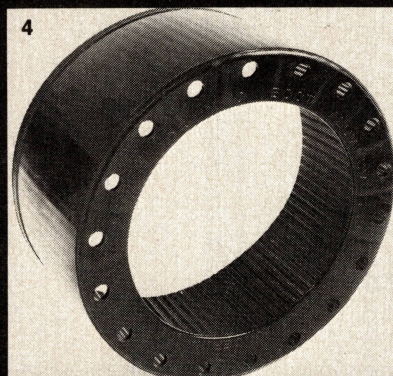
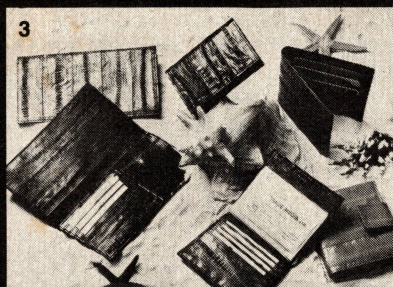
# New Gear



**1 America's Ghost Fleet, 1978** — a calendar which features shipwrecks from every American coastline including the Great Lakes, Gulf of Mexico and major river systems. With photos of the Andrea Doria by Jack McKenney. \$3.95 plus 50¢ postage. Spyglass Prod., 2818 W. Washington Bl., Venice, Calif.



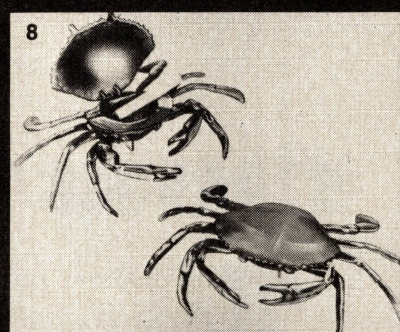
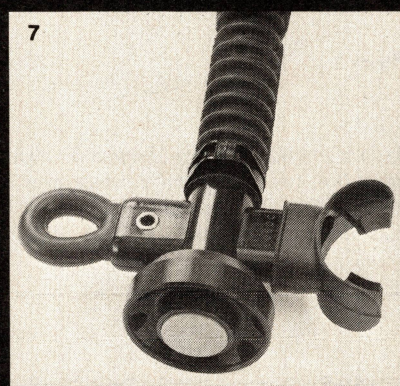
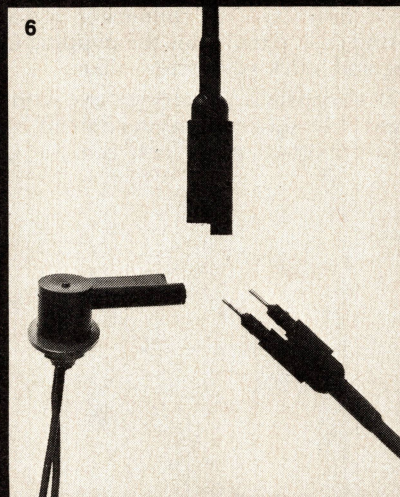
**2 Underwater writing slate** — with a good quality compass and a grease marking pen attached. You'll think of a dozen uses for this handy little piece of equipment, such as keeping track of your air consumption or bottom time. \$8.95. It's from Global Manufacturing Corporation and at your dive shop.



**3 Wallets** — handcrafted from the skin of the Burgeri eel. Soft and durable, they have exotic markings and come in brown, rust, or tan. Men's and women's styles. Secretariat, \$15.95; bi-fold, \$13.95; credit card case, \$8.95. Trade Media Ltd., 3113 Fern Valley Road, Suite 202, Louisville, Kentucky 40213.

**4 Tank Boot** — for 80 cubic foot aluminum tanks. This self-draining, round-rimmed boot comes in black and has a narrow profile. It is guaranteed not to crack or fall off for three years. 7.25 inches in diameter. Priced at \$4.50. From Underwater Kinetics, 7052 Convoy Ct., San Diego, Calif. 92111.

**5 Ever-Dip Plastic Coating** — a new product which protects equipment from rust and bumps. It has a permanent seal and adheres to wood, glass, metal or plastic. In red, blue, black, orange, yellow and clear. One quart, \$11.95, one gallon, \$36. From Global Manufacturing Corp. and at your dive shop.

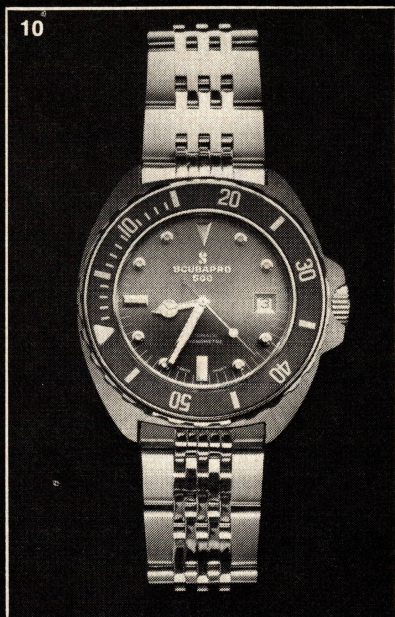
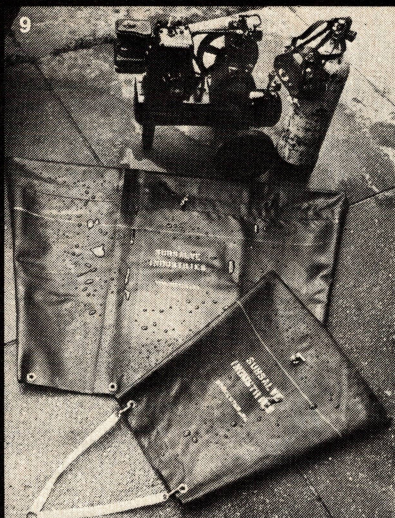


**6 Sea-Loc** — a new and inexpensive electrical connector which can be unplugged underwater. Available as an in-line connector to straight or coiled cords (for underwater strobes), \$44.95, and as a bulkhead for waterproof housings, \$34.95. Underwater Kinetics, 7052 Convoy Ct., San Diego, CA 92111.

**7 Breathing mouthpiece** — allows a diver to breathe air directly from his BC. The special inhale/exhale diaphragm unit allows air to flow from the BC to the diver and then exhausts directly through the valve into the water. \$30. From U.S. Cavalero, Inc., 3186 Airway Ave., Bldg. F., Costa Mesa, CA 92626.

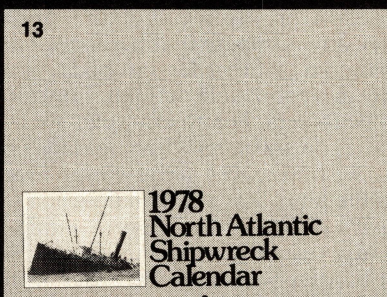
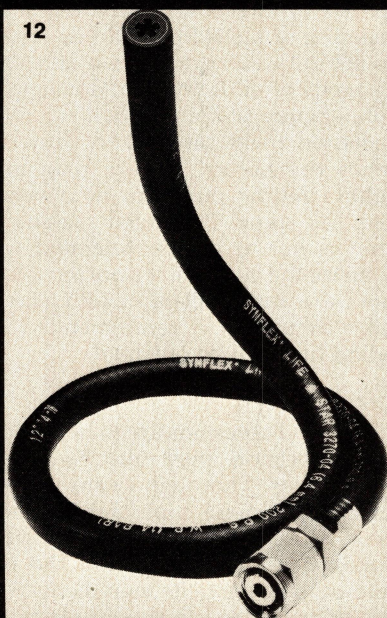
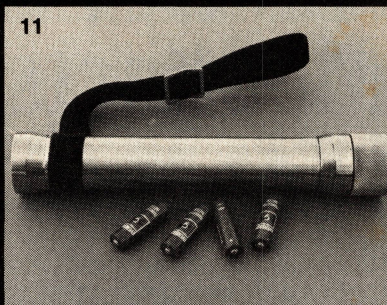
**8 Brass crab** — a sea creature crafted in brass with a flip-top shell. It makes an unusual paperweight, ash tray or receptacle for paperclips, etc. From claw to claw it measures almost 7½ inches. Priced at \$10.98. Window Shopper House, Dept. FM, 1433 South 1400 East, Salt Lake City, Utah 84105.





**9 Heavy-duty lift bags** — designed for the commercial diver and serious-minded sport diver. Constructed of rubber-impregnated nylon for rough use and long life, each bag has a dump valve and lift rings. Lift capacity varies from 100 lbs. of lift to 20,000 lbs. Priced from \$22 to \$1100. Subsalue Industries, 79 Forest St., Worcester, Mass. 01609.

**10 Solid gold dive watch** — made with 199.5 grams of pure 18 ct. gold, delicately balanced by a fine, 25 jewel, Swiss movement. Pressure-tested to 1640 ft., it has a recessed mineral crystal and convex case. \$4,000, or according to the price of gold. Scubapro, 3105 E. Harcourt St., Compton, Calif. 90221.



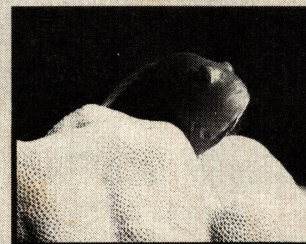
**11 Dipstick** — a miniature digital sonar for underwater use. It has a range of 6 to 600 feet, with one foot resolution. This completely self-contained unit is about the size of a flashlight and operates up to ten hours between charges. \$480. Vectronic Instruments, 568 A Alger Dr., Palo Alto, CA 94306.

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**13 North Atlantic Shipwreck Calendar, 1978** — with photos and information on well-known shipwrecks which are easily accessible to sport divers. This handsome calendar has lots of space for notations. \$2.95 plus 40¢ postage and handling. Norlantic Publications, P.O. Box 611, Needham, Mass. 02192.

## 14 NIKONOS PHOTOGRAPHY — the CAMERA and SYSTEM

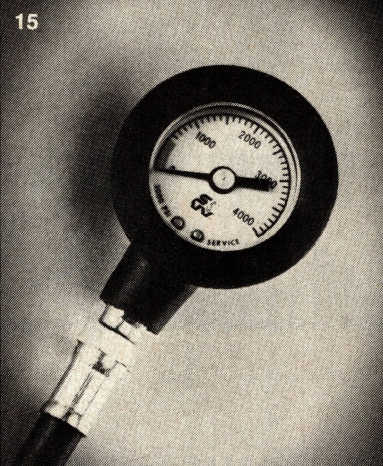
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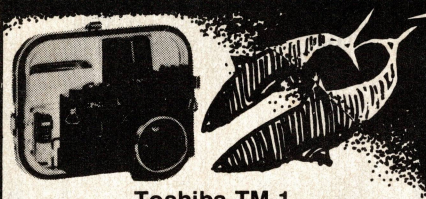


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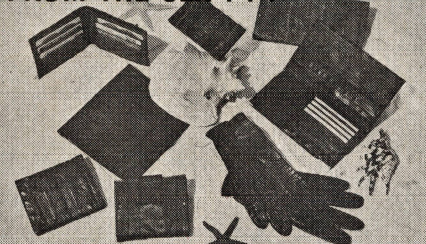
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# Medifacts

(continued from page 31)

**Skin pain.** Sharp intense pain with a red rash starts immediately upon contact with something venomous, like a jellyfish or fire coral. Any tentacles remaining of the skin should be rinsed off with salt water, lifted off, or if necessary scraped off. If you can, douse with alcohol before scraping. Then rub with moistened meat tenderizer, and the sooner the better. Severe pain and swelling follow puncture by a venomous fish spine. Prolonged soaking in water as hot as can be tolerated will neutralize the venom if it's not too deep. If hot water isn't available, a cold pack to inhibit circulation is recommended till medical help can be obtained.

## SKIN WOUNDS

If cuts and abrasions are to heal without complication, they must be free of contaminants. Thorough cleansing and protection are more important than medicinal goos. If an antiseptic is used it should be non-irritating, and the patient not sensitive to its ingredients. If a cut is to be stitched, it should reach the doctor within six hours, or the chance of infection multiplies. Let the doctor check any puncture that harbors a bit of sea urchin or other foreign body, especially in a palm, sole, or joint. Punctures can be foolers. For an example, if a person has on sneakers when he steps on a nail, we find rubber in the wound nearly half the time; that's certain infection unless it's removed. For minor wounds, a tetanus toxoid shot is indicated if the last booster was more than five to ten years ago. For more severe wounds, the doctor will decide what to do.

Any wound that involves an eye, and any puncture of the chest or abdomen deserves medical evaluation. Blindness has followed eye injuries that were neglected. If a body cavity has been penetrated (and you can't be sure), there is a potential for major complications such as pneumothorax, peritonitis, and internal hemorrhage. A chest puncture that hisses or bubbles should be sealed with a damp cloth or anything handy, so that the pneumothorax won't get worse. However, if this seems to make the patient worse — cyanotic and shocky — he may be developing a tension pneumothorax from a tear in his lung. In this case, removing the seal, at least temporarily, may relieve the tension and avert a fatal outcome.

An amputated part should go along with the patient, preferably kept chilled. In a few cases, some medical centers have been able to put them back

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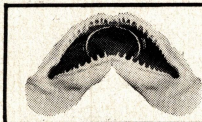
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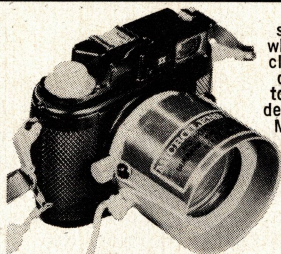
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on. Even a bit of skin saved will prevent the necessity of taking grafts.

## FRACTURES AND DISLOCATIONS

One's objective is to minimize pain, swelling, and further damage while transporting to a medical facility. If a fracture is jostled or permitted to flop about, the sharp bone edges will cut through muscle and blood vessels, and maybe nerves. Therefore, splinting has first priority. Elevation and application of cold come next. A fracture or dislocation may compress vessels and nerves, and swelling adds to this. Examine the hand or foot of the injured limb. Check for absence of a pulse or of warmth, for presence of swelling or poor color, and for inability to feel, or to move fingers or toes. Any of those signs means the need for medical help is urgent.

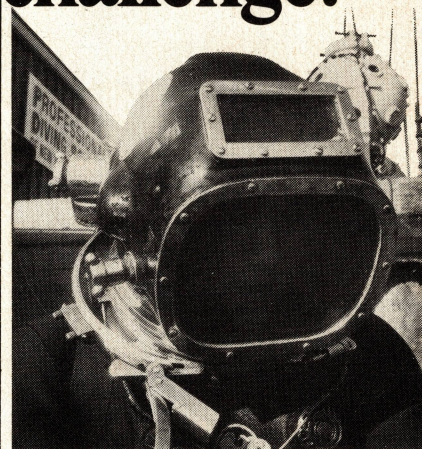
Divers who mess around rocks when the waves are up should wear crash helmets like motorcyclists. When concerned about a possibly broken head, look for confirmatory signs: a bump or cut, bleeding from an ear, or clear fluid draining from the nose. Look also for signs of brain injury: reduced consciousness, unequal pupil size, paralysis of one arm and leg. The neck should be splinted (it could be broken, too), and the head and shoulders raised a little to reduce pressure on the brain. When there's a history of forceful impact, like falling down a cliff or getting creamed by big surf, don't move the patient till you've ruled out neck or back fracture. Pain when the patient attempts slight movements, and tenderness when you press gently, are clues. Loss of feeling and/or movement below any given level is confirmatory. Unless you're sure there's no fracture, keep the neck and body immobile till trained people arrive with a stretcher. Aids are a small towel behind the neck, sand piled beside the body, or dive bags beside the head.

## DECOM METER UPDATE

Owners of Scubapro's automatic decompression meter who have not received the latest instruction booklet should write to Scubapro for their free copy. The new booklet has important information for all decom meter owners. It was prepared by the Scubapro engineering department in consultation with Dr. Glen Egstrom, Professor of Kinesiology and Diving Safety Officer, University of California, Los Angeles.

If you are a decom meter owner and wish to keep up to date on the latest information about your instrument, send its serial number along with your name and address to: Automatic Decompression Meter Update, Scubapro, 3105 E. Harcourt, Compton, Calif. 90221.

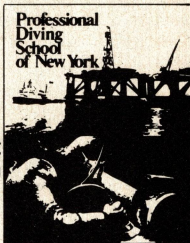
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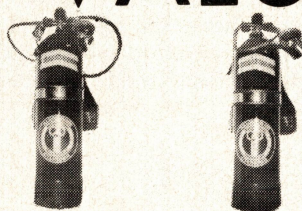
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## FRESHWATER DIVING

(Continued from Page 57)

hatched embryos. Members of the catfish family are noted for their care of the young, and are easily identified because of the four pairs of barbels around the mouth, spines in front of the short dorsal and pectoral fins and smooth, scaleless bodies. Individual species are identified by head shape, color, spines, and rays on the anal fin.

A full week later, I returned to Pearl Lake to find that the bullhead was still on the egg mass and would accept no food throughout its long vigil. The lake was now full of free-swimming juveniles huddled in small schools. They reach a length of three inches in the first year and mature the third year, at a length of perhaps 16 inches. Now, they too will complete the entire life cycle.

The catfish family are bottom feeders and scavengers, feeding on almost anything, including insect larvae, fish eggs, plant material and worms. During the winter months, they are often found dormant on the bottom, generally hidden under logs or a cover of weeds. Most catfish are nocturnal and are often quite inactive during daylight hours, making them good subjects for study.

Thanks to this yellow bullhead, my interest in freshwater diving has been rejuvenated. Like most things, they take on new character when you learn something about them. So, don the old wet suit and hit the water. Then visit the library and keep diving! ➤

## MARINE LIFE SLIDES

Thirty-five millimeter color slides of over 1500 marine life subjects with encyclopedia descriptions are now available from the Visuals company.

The slides may be purchased individually or in sets. The more than 140 catalogs contain 120,000 slides. These make good teaching aids.

The Marine Catalogue, which covers all aspects of underwater study, plus three sample slides, is \$5. For more information contact: Visuals, D-17, 440 N.W. 130 Street, Miami, Fla. 33168. ➤

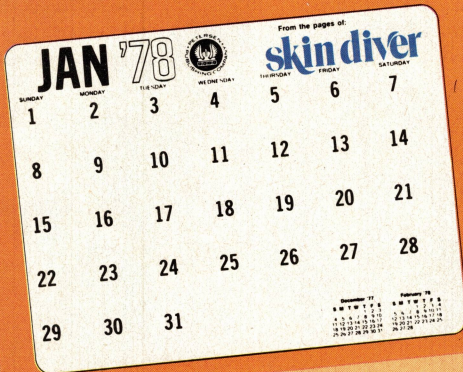
## YMCA INSTRUCTOR COURSE

Florida Keys Community College will offer a YMCA scuba instructor course starting January 5, 1978. The nine-semester-hour course culminates in mid-April with an instructors' institute. Those who pass the course and the institute will earn the YMCA Scuba Instructor rating as well as college credit.

Most of the waterwork for the course will be in clear waters around the Keys' coral reef. For information write: Florida Keys Community College, Aquatics Program-SIT, Key West, Fla. 33040. ➤



A veritable pincushion, his fascinating smile belies across the photographer's path on a reel just in St. Croix. He attempts to smile away from the bubble-blowing strangers—but was apprehended before he could make his escape good. Rather annoyed with the unprovoked harassment, the creative creator distanced his body and extended his spiny spines, instead of smiling. Instead of smiling, the balloonfish remained an enigma, curiously and mysteriously on the subjects of another Timbulbul photograph. His needling spines were completed, he was released and turned his disproporportionate fins, making a slow and deliberate departure. Once in the safety of his cave-like home, he deflated himself on the peril and was safely encountered. He opted to do without the mooney request and his confines



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Want to dive a huge intact wreck? See Puget Sound king crabs and giant wolf eels? Collect abalone? Play with one of the largest octopuses in the world? Spear a lingcod for dinner? Go mad with so much color to photograph? Want to land on an uninhabited island? Night dive in a calm, phosphorescent cove? Listen to a sweet guitar and sing around a beach bonfire? We did all of these things—and more—in one weekend on *Rendezvous* at the West Coast



# RENDZVOUS

OFF VANCOUVER  
ISLAND

## NEW LOOK AT PACIFIC NORTHWEST

of Vancouver Island.

BY BETTY PRATT-JOHNSON

Virgin waters crowded with shipwrecks and marine life — not divers — are on every side in Barkley Sound.

*Rendezvous* is the only regularly-scheduled charter taking divers to this largely unexplored area. Even those with their own boats have found Barkley Sound very difficult to dive. Compressed air has not been available near West Coast sites.

Navigating these waters is extremely dangerous for the uninitiated because of fog, currents and hidden reefs.

So this year-round charter with air on board is the answer for divers who, until now, have only been able to dream of what is under these wilderness waters.

*Rendezvous* is sturdy. Formerly the Anglican Church mission ship, this 45 foot vessel has been tested, over the years, under some of the roughest conditions while sailing up and down the remote West Coast. She's proven herself seaworthy.

Charter operator Dave Christie knows a lot of good places to take you.

photograph by L. D. Lehmann





photograph by Author

*The setting sun shimmers on Rendezvous in a quiet cove at Jaques Island. Rendezvous is the only regularly scheduled charter boat taking divers to this largely unexplored area off the West Coast of Vancouver. Navigating these waters can sometimes be dangerous.*

He has a solid year of experience diving and navigating among the islands in Barkley Sound — more than 119 of them. Before that, he was a NAUI instructor on the East Coast of Vancouver Island for many years. On both coasts Dave knows the sites and he's always ready to explore — an avid diver to the core. He can help you cope with local dive conditions: dense kelp, unpredictable currents, and surge.

Diving is unlimited. An air bank hidden under the cabin steps quickly fills 12 to 18 tanks. A portable compressor pumps more. Up to three dives a day is usual. Or your group might want to make your third dive at night. Twelve divers can be accommodated on *Rendezvous* for day or weekend trips. Longer trips can be arranged. A two-day weekend starts at \$35 per diver and includes air, guide and meals.

What's under and on the water? What do you see and do while cruising and diving on Canada's West Coast?

Seafood is abundant. Divers find abalone, lingcod, rock scallops and snails. Non-divers may catch salmon. You can eat a different seafood delicacy every day.

Shipwrecks are almost as abundant. One map shows over 500 wrecks on the West Coast of Vancouver Island — many still unexplored by divers. Some are shallow and easy to dive. Dave took us for our first Barkley Sound dive to the *Vanlene*, an 8354 ton cargo vessel which ran aground as recently as March 14, 1972. She was carrying 300 Dodge Colt cars; 131 were airlifted off. The rest still remain.

Today divers can see outlines of the cars on the sea floor, salvage plastic pieces of cars which have not been destroyed by salt water, and hope for valuable finds from the ship itself. Swimming through the enormous intact hold of the ship is sensation enough for a dive, but more treasures are waiting to be found. Divers have not yet penetrated all of her huge hull which projects from above the surface down to 120 feet deep.

Photographers don't know where to start — or stop. Mint green surf anemones, China rockfish and orange rockfish are some of the colorful creatures not frequently seen elsewhere but often seen on the West Coast. Wolf eels, king crabs, ratfish, octopuses and dogfish are abundant as are plumose anemones, orange cup corals and basket stars. Take plenty of film.

Seasons on the West Coast? September is the favorite time when conditions are splendid both above and below. Underwater visibility is best in winter, but surface weather may be rough. The general plankton bloom usually occurs during July; more plankton may come at other times during summer, but only for a few days and only in localized patches. If you find one place murky, simply move to another site. Fog may shroud the area during August. However, one August I

dived Barkley Sound and found good conditions on the surface as well as underwater. Only the most particular photographers will delay their visit until winter when excellent visibility is assured. All others find West Coast diving rewarding throughout the entire year.

Between dives you may learn more about tidal wildlife from the naturalist at Pacific Rim National Park, stop to swing from the trees at Jaques Island, meet West Coast Indians out for a picnic. Or wander along a deserted beach. Both above water and below water are beautiful at Barkley Sound.

Photographers, spearfishermen and wreck-hounds all become bewitched by the abundant wilderness. Even non-divers get hooked. Once you've tasted the raw wealth of this region you'll find reasons to return again and again to *Rendezvous* — on Canada's West Coast.

How to go: *Rendezvous* sails out of Port Alberni (92 miles north of Victoria and 29 miles west of Parksville) on Vancouver Island. Drive to Port Alberni from Seattle following Interstate 5 north 143 miles to Vancouver, then 12 miles to Horseshoe Bay where you take the British Columbia Ferry (2 hours) to Nanaimo on Vancouver Island. Go north on Island Highway 23 miles to Parksville. Turn west onto Highway 4 and continue 29 miles more to Port Alberni. Or fly into Vancouver, Victoria or Nanaimo, then bus to Port Alberni. >»»

## VANCOUVER ISLAND GUIDE

### For Reservations

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Rendezvous Dive Ventures  
Box 135  
Port Alberni, B.C.  
V9Y 7M6  
(604) 724-4271

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### Tourist Information

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(604) 681-5177

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## ABALONE FARMING

(Continued from Page 39)

bara. Unfortunately, this is not enough to carry on the massive seeding program the foundation feels is immediately necessary to stop the rapidly declining abalone population.

The foundation is seeking support from various individuals and organizations and has an educational program for interested groups. The program utilizes a 16mm movie exploring some reasons why the abalone population is rapidly decreasing and a slide show illustrating how the foundation is repopulating it through mariculture.

The motto of the Santa Barbara Mariculture Foundation is "The Destiny of the Oceans is in the Hands of Man." Jim summed up this philosophy beautifully as he closed his talk with the visitors, "We've been the Daniel Boone type. We just blissfully hunted out the buffalo and sardines. Now we are almost through with the abalone and lobster. Maybe it's time for a Johnny Appleseed ethic."

## BYRD MOVES UP AT COASTAL

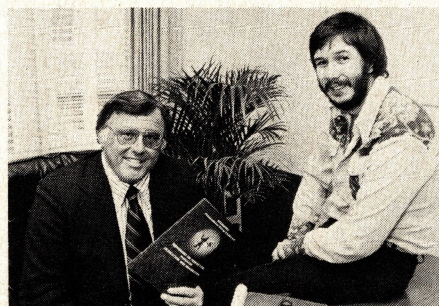
Veteran dive instructor Don Byrd has been named assistant director of the Coastal School of Deep Sea Diving, Oakland, California. Byrd will assist company president Alfred Mikalow in management of overall operations and supervision of student training.

Formerly chief instructor at Coastal, Byrd worked many years for dive contractors in Gulf Coast and South American oil fields. A specialist in mixed gas and deep air diving, he has also worked on salvage operations and dam and bridge construction.

## SCUBAPRO CATALOG WINS AWARD

The photography in Scubapro's 1977 product catalog was judged best of the Collateral Division by the Annual Society of Art Center Alumni Show, Pasadena, California. This is a yearly event with entries from around the world.

Photographer David Siegel's award-winning photo created a supernatural



illusion of modern space and design combined with the feeling of prehistoric origin. This was the fourth award won by Scubapro catalogs in recent years. It was designed by Roy Brizz, of Roy Brizz Advertising, Los Angeles.

## GLENN BEALL'S Monthly Special

### WRIST AND NECK LANYARDS

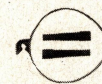
#33HC2, #33HC4



Guard against loss of expensive equipment. Looped Nylon line has nickel plated quick release thumb lever—and Dayglo Red plastic slide for tightening the loop. Wrist Lanyard 11" long \$3.00. Neck Lanyard 20" long \$3.25.

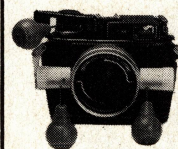
### Other Glenn Beall Diving 'Musts'

#### OCTOPUS LOCATOR KIT #55HC2

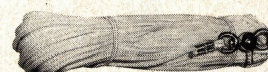


For growing number of Octopus Regulator users, we provide Hose Holders and Hose Guards in bright red Dayglo—which remains bright even in great depth and poor visibility. Distinctive color allows the anxious diver to identify the extra second stage regulator. Kit price (1 Hose holder and 2 Hose Guards): \$8.50, plus 75 cents ship & handl.

#### FLOATING ALLEN WRENCH #48HC2



If you drop it in the water, it pops to the surface immediately. Use with any 6-32 socket head set screw. The oversize handle is bright orange. \$2.80, plus 50 cents ship & handl.



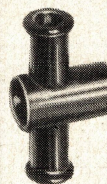
#### UTILITY LINES

400-lb. test diamond braided Nylon. Relatively stiff line minimizes tendency to tangle on tank valves, fin straps, underwater projections. Bright white line is non-floating, a must for cave, ice and shipwreck diving. With nickel plated one-hand safety snap, with thumb release. 25 ft. #40HCJ1, \$4 plus 75 cents ship & handl. 50 ft. #40HCJ2, \$5.30 plus 75 cents ship & handl. 100 ft. #40HCJ3, \$7.50 plus \$1 ship & handl.

#### NIKONOS MOUNTING SYSTEM



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#### FLOAT TOOL #22HC2

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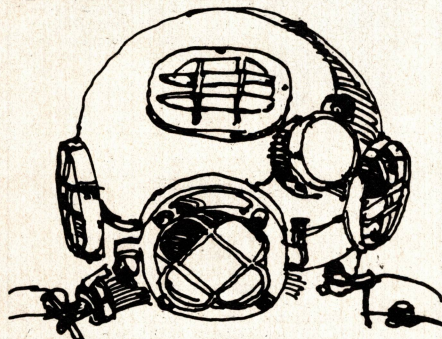
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## UP CLOSE WITH DACOR

BY JIM AND CATHY CHURCH

The purpose of this product review is to take a closer look at the three Dacor extension tubes which can be used with either the Nikonos 35mm or 28mm lenses.

### A QUICKIE REVIEW

Before discussing the Dacor tubes and framers, let's have a quick review for those readers who are new to the subject of extension tubes (If you don't need the review, go on to the next section):

1. Extension tubes are metal cylinders placed between the Nikonos camera body and the lens to reduce the focused distance to only a few inches. The camera is aimed with a focal frame.

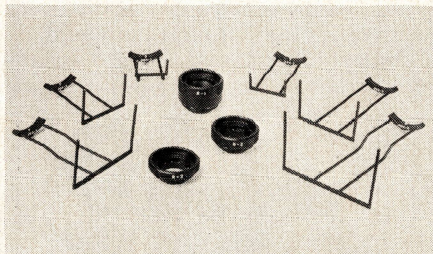
2. The sizes of the tubes are often expressed in reproduction ratios. The ratio has two numbers separated by a colon. The first (left) number refers to the size of the image on film; the second refers to the subject's life size. If the image on film is one inch high, and the subject's life size is two inches high, the ratio would be 1:2 (pronounced one-to-two).

3. Depth of field is very limited. With the lens set for f22, it will be about 3/4, 3/8 and 3/16 inches for 1:3, 1:2 and 1:1 extension tubes, respectively.

4. When the Nikonos lens is moved forward by an extension tube, more light is needed for the exposure than is indicated by the aperture setting of the lens. You will compensate by holding the strobe much closer to your subjects — usually about four to nine inches.

### THE THREE TUBES

The three Dacor extension tubes are made of machined aluminum with a black, anodized finish to protect the tubes from corrosion. The sizes are stamped on the sides of the tubes and

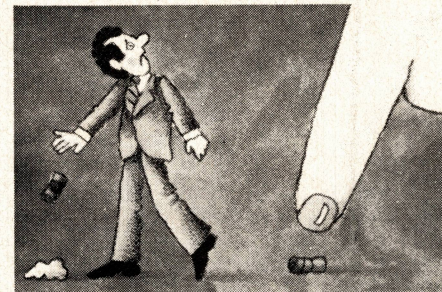


photography by Authors

are accentuated with white paint. Tube R-1 is the longest tube, R-2 is the middle size, and R-3 is the shortest of the three. The longer the tube, the greater the amount of magnification.

The rear of each tube is machined to resemble the rear of a Nikonos lens mount. The bayonet mounting of the tube which engages the camera body is spring-loaded to ensure a snug, but gentle, connection between the tube and the camera body. A guide pin at the

## A Three Point Program To Stop Pollution



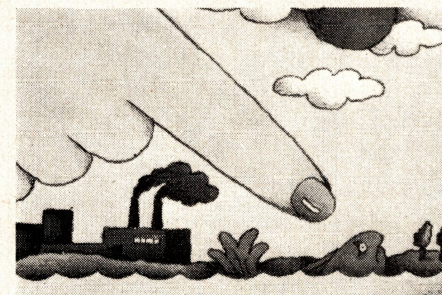
### The Litter Point.

You just saw someone toss a can on the ground. Use this point to point it out to him. Maybe next time he'll toss it in a litter basket.



### The Air Pollution Point.

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### The Water Pollution Point.

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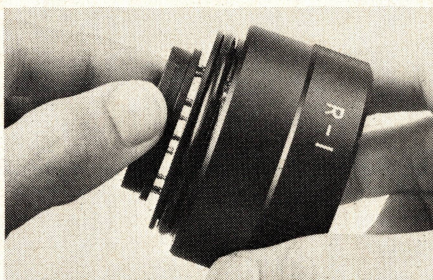
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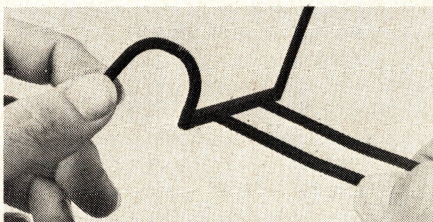
rear of the tube fits into one of the slots on the Nikonos casing to prevent the extension tube from rotating when it is on the camera. Note: Most extension tubes do not have a spring-loaded mount or a guide pin. At this writing, these are new features for extension tubes.

The front of the extension tubes are machined to resemble a Nikonos camera body and the lens is installed on the tube as if it were being installed on a Nikonos camera body. Two slots are machined on the front surfaces of the tubes to engage the two alignment pins of the Nikonos lens mount.



## THE FLEXIBLE FRAMERS

While the focal frames have the same general appearance as the focal frames of other extension tubes, they are significantly different: The two corner posts which frame the left and right sides of the picture are actually coil

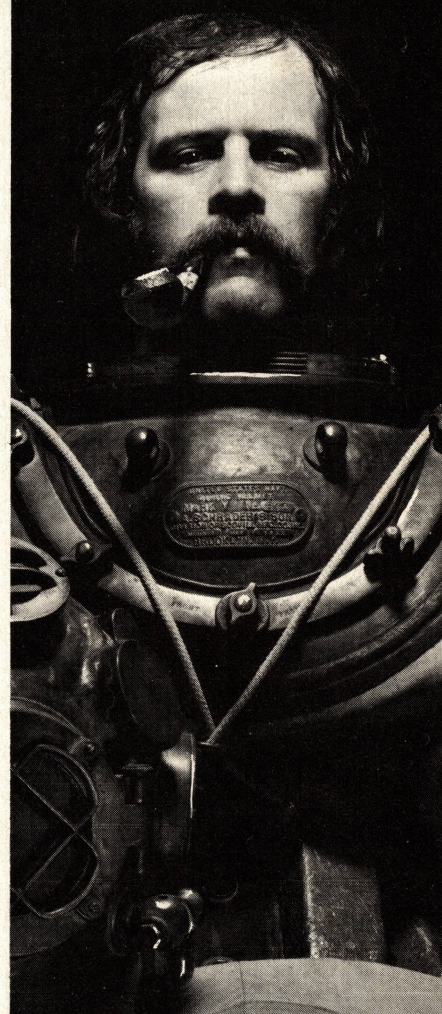


springs. Threaded inserts at the ends of these springs screw into the tapped holes at the ends of the solid cross bar which frames the bottom of the picture area. The posts can be installed or removed with finger pressure. For storage or packing, a second set of tapped holes can be found at the rear of the cross bar. When the corner posts are screwed into these special holes, the focal frame is "flattened out" for packing.

A set screw is threaded into the mount at the base of each focal frame. You attach the framer to the extension tube with finger pressure on this set screw. When you remove the framer, leave the screw threaded into the framer mount and you won't lose it.

The flexible corner posts allow you to work in crevices and other tight places where a solid framer would bump against coral or rock and prevent you from framing your subject. With the flexible corner posts, you simply bend them out of the way. However, be sure that they don't bend inward and show up in your picture! And should you need more flexibility, you can remove one or both posts while underwater — but don't lose these small parts.

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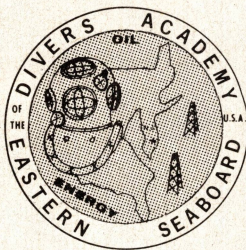
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## FOCAL FRAME SIZES

There are six different focal frames: three are for use with the Nikonos 35mm lens, and three are for use with the 28mm lens. Because the sizes of the picture areas and the lens-to-subject distances all differ, you must use the correct combination of lens, tube and focal frame. This will be easy because these parts are clearly marked with identifying numbers. (See table, below.)

### GUIDE TO DACOR EXTENSION TUBES FOR THE NIKONOS

Extension tube number	for 35mm lens		for 28mm lens	
	framer model	repro- duction ratio	framer model	repro- duction ratio
R-1	35R-1	1:1	28R-1	1:0.9
R-2	35R-2	1:2	28R-2	1:1.8
R-3	35R-2	1:3	28R-3	1:2.5

The reproduction ratios are slightly smaller when the tubes are used with the 28mm lens because the 28mm lens focuses closer than the 35mm lens which reduces lens-to-subject distance.

## PUTTING THE SYSTEM TOGETHER

While the exact order of steps could be changed slightly, here is a summary of how to assemble a Dacor extension tube system on a camera:

1. Attach the lens to the extension tube as if the tube were a camera body.
2. Attach the tube to the camera body as it were a Nikonos lens.
3. Attach the focal frame to the extension tube with the set screw.

Note: Make sure that the O-rings are lubricated lightly with silicone grease — do not force dry O-rings as the surface of the O-ring can be damaged.

## MAINTENANCE

We suggest the following maintenance procedures:

1. Pack the two threaded holes at the rear of the cross bar with silicone grease to protect the threads from salt water.
2. Lubricate the corner post threads when the posts are installed. Pack the bottoms of the holes (underside of cross bar) with silicone grease to keep water out of the threaded connections.
3. Spray the corner post springs with silicone to protect them.
4. Occasionally spray some silicone on the blade of a small screwdriver. Use the tip of the screwdriver blade to apply drops of silicone to the heads of the four screws of the spring-loaded mount.
5. Occasionally remove the O-ring at the rear of the tube by squeezing it out with your fingers. Clean groove and O-ring with lintless cloth and apply a thin coating of silicone grease to the O-ring with your fingertips.

## FOR MORE INFORMATION

Start with your local dive shop. If they don't have information about the Dacor extension tubes, write to: Dacor, Inc., Box 157, Northfield, Illinois 60093.

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# SDM TRAVEL SECTION

## WHERE TO GO/HOW TO GET THERE/WHAT TO DO

**A**rising from a virtually sleepless night below the tossing decks of our rugged vessel we are greeted with overcast skies, now lake-calm seas and the surrealistic sight of the Bay Islands swathed in a light and dissipating fog. We have just arrived at the coastal islands off Honduras after pounding out a successful overnight voyage from Swan Island riding the front of hurricane Eloise.

We could not help but be awestruck as the overcast broke revealing the summits of 1200 foot peaks highlighted by sunlit cascades of new runoff water plummeting down the cliffs to the white sands below. As I pondered the contrast from the brooding storm-gray of the the night before, my mind's eye fully expected to see Hernando Cortez, in full armor, ride forth from the verdant jungles to greet our arrival.

A scenic archipelago consisting of three major and three minor islands all of volcanic origin, the Bay Islands, first discovered by Columbus on his fourth and final voyage to the New World, are located some 30 miles from the north coast of the Republic of Honduras in Central America. In the early morning hours the Honduras mainland looks to be a mere stone's throw away. As the day progresses, the cooling ubiquitous trade winds provide natural air conditioning and the resulting condensation encumbers horizontal visibility but enhances the afternoon sky with the best in tropical cloud formations and spectacular sunsets.

During the early sixteenth century, Spanish slave raids, originating from Cuba and Jamaica, depleted these populous islands. By 1530 the abductions eased under the then-benevolent hand of Cortez who hoped to render the natives into the service of Spain through mild treatment and the promise of protection from abuse.

By the end of the sixteenth century the Spanish fleets had a monopoly on trade throughout the



### ROATAN ADVENTURE

BY RICK TEGELER

Caribbean. It wasn't until the turn of the seventeenth century that this strangle-hold was broken by the now-romanticized buccaneers pirating under English, French and Dutch flags. The same trade winds that brought the Spanish galleons to the Bay Islands also proved their demise as it also filled the sails of the smaller, faster ships of the sea rovers who were able to wreck havoc on the cumbersome galleons of the Spanish trade fleets, disappearing quickly through the numerous reefs and into shallow bays protected by easily defensible bluffs. One of the results of these international hostilities was the decimation of the native population on the islands; the natives were killed or forced

into either slavery or flight to the safety of the mainland.

The islands remained almost unoccupied until the middle of the eighteenth century with the exception of the natural population of deer, rabbits and brilliantly colored parrots and other tropical birds, many of which can still be seen today. In 1742, the English began to trade from the Bay of Honduras, building military installations on Roatan at the port town of Coxen Hole and also at Port Royal. This trade brought settlers from the British colonies on Jamaica and the Caymans to the mosquitoless shores of two of the Bay Islands, Utila and Roatan. Then, as today, swaying palms, tropical fruits, flowers, and fish abounded in and around the islands making them quite self-sufficient for the new populace.

Again, in 1796, the spectre of death and slavery was to flirt with these paradise isles when England made Roatan a penal colony. With the increasing influx of English citizens to Roatan and the other Bay Islands, the Crown, in 1850, annexed all six under the name "Colony of the Bay Islands." This annexation was viewed as an illegal imperialist seizure by American Monroe Doctrine politicians. Buoyed by the Clayton-Bulwer Treaty of 1850, these politicians wielded enough muscle and influence in the United States and Central America to force the signing of the Wyke-Cruz Treaty between Great Britain and Honduras, resulting in the ceding under limited sovereignty of the islands to Honduras.

Despite the new alliance between mainland Honduras and the offshore islands, the 30 mile separation was enough to preclude mutuality of interest between inhabitants. Therefore, little traffic was forthcoming between the new colony and its parent. The results of a history of political uncertainty are evident today in that the Bay Islands are literally self-governing and enjoy





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## ROATAN

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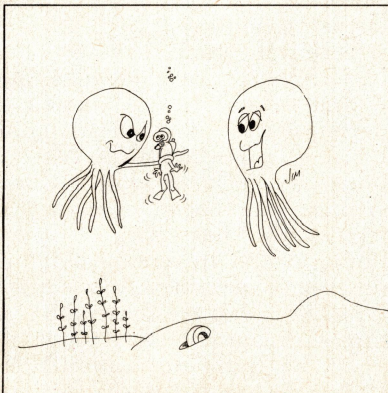
The present day adventurer/explorer will find Las Islas de la Bahia or Bay Islands an unspoiled paradise. The bilingual population of ten thousand is one of the most friendly and spontaneous in all of the Caribbean. The land mass of over 300 square miles is sprinkled with numerous, seldom-visited Mayan archaeological sites as well as old pirate bastions. The quantity of old rum bottles recently unearthed suggests many nights of revelry and, as history has it, the celebrating was over caches of Spanish gold still awaiting the shovel of modern day adventurers and soldiers of fortune.

Fishing about the islands is exceptional. The waters teem with most species of game fish that distance and lack of over-abundant facilities will protect through the foreseeable future.

The skin and scuba diving is superb. Most of the picturesque cays, reefs and bays are virtually unexplored. The gin-clear water proves a haven for the underwater photographer as the reefs abound with an astounding quantity of exotic fishes. The added excitement of exploring some of the hundreds of uncharted sunken wrecks makes the tedium of travel more than worth the effort for the sport diving enthusiast.

The lack of large numbers of "tourist" facilities will preclude the blight that has befallen many similar Caribbean paradises. However, the facilities which are available are clean, with good food and friendly service provided by natives who genuinely care and take pride in their heritage.

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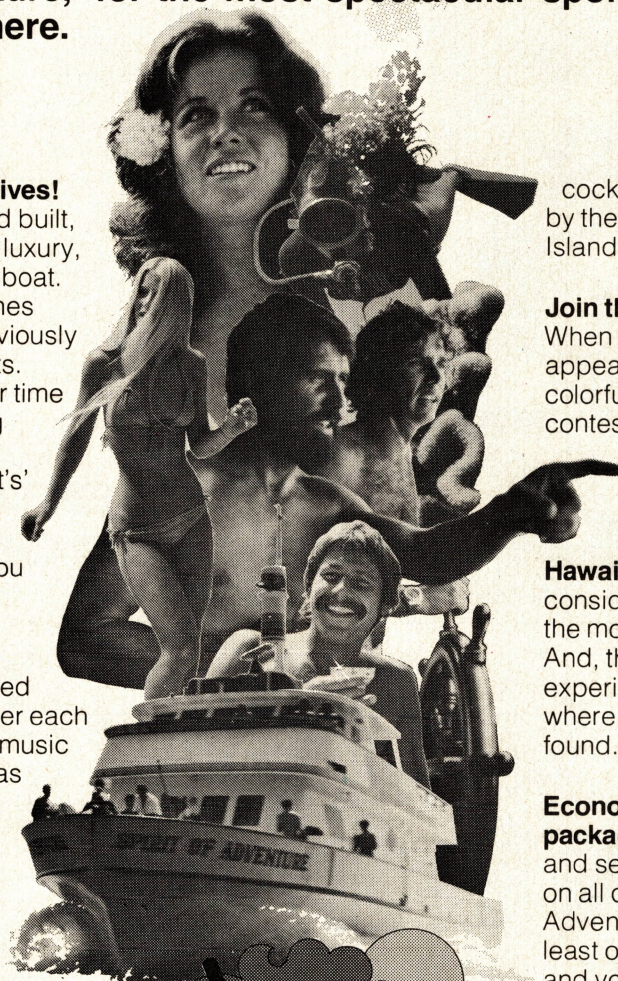
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The course was a success and according to Lt. Terrell, a rescue helicopter pilot at Ramey, plans are underway to conduct a second scuba course.

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PADI International has established a branch office in Tokyo to administratively manage and support PADI Japanese dive programs. The office was deemed necessary because language difficulties created problems in estab-

lishing effective PADI programs there.

PADI Japan offers all PADI programs consistent with the standards established by PADI International. Persons living in Japan who have American military addresses should continue to transact business through PADI international offices in California, as PADI Japan serves Japanese nationals only.

The PADI Branch in Japan is currently offering a wide range of instructor services, and has an active on-going program designed to promote dive interests. Management of the branch is supplemented with a board of directors, elected at an annual membership meeting. The board members meet at least once monthly to coordinate the programs and procedures. Coordination of the programs between the United States and Japan is handled by Roy Goodman, PADI Master Instructor. Goodman recently attended the PADI Course Directors Workshop conducted at PADI Headquarters in Santa Ana, California.

The Tokyo office processes all Japanese certification cards and has instructional material printed in both English and Japanese.

The next annual membership meeting is planned for January 21-22, 1978.

The contact address for PADI Japan is Box 59, Ushigome, Tokyo, Japan.

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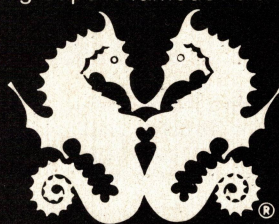
Flag had added to its equipment a diesel-powered, 35 foot dive boat suited for custom dive groups and a 40 foot, steel-hulled sailboat for specialized, small group charters. Flag's emphasis continues to be personalized service for the discriminating diver. All-day custom dives in the sailboat offer the visiting diver the dual fun of a leisurely sail and exciting dives. For individuals or small groups who want rapid and speedy service to the dive site, a 24 foot, fiberglass dive boat can get the diver there at 20 knots. For non-diving fun, sailing, snorkeling, beach lunch trips and moonlight supper cruises are available. All dive trips are supervised by U.S. certified dive instructors.

Flag formerly had a marketing association with Teach/Tour, but now information and reservations are to be made directly with Flag Diving Service, P.O. Box 490, Grand Cayman, BWI.



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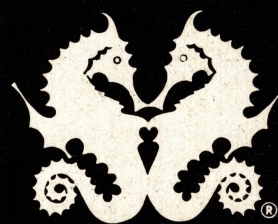
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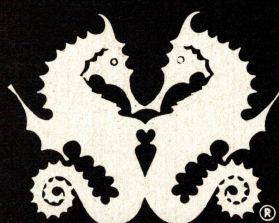
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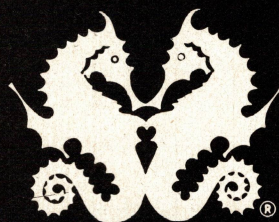
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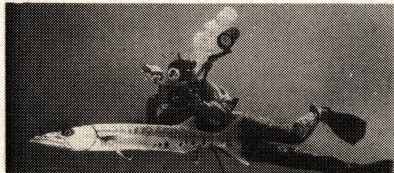
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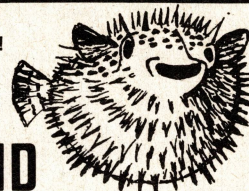
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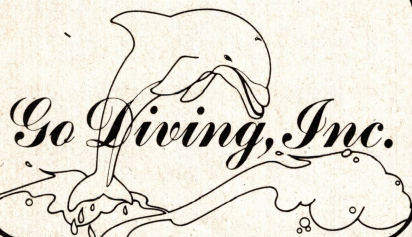
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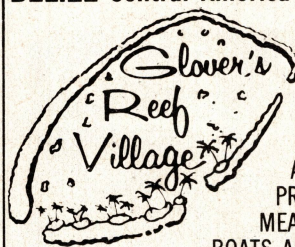
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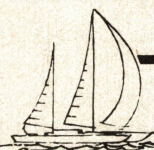
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**NEW ZEALAND NESSIE?**

The decomposed carcass brought up by a Japanese fishing trawler last April off New Zealand might have been a plesiosaurus. This animal is thought by scientists to have become extinct 65 million years ago. Others, however, believe the famous Loch Ness Monster is none other than a plesiosaurus.



Photographs courtesy Taiyo Fishery Co.

The New Zealand carcass was brought up in a fishing net which had been lowered to the seabed 300 meters below. It was brought onboard the boat with a crane after fishermen passed a cable around its central part. The smell of the 32 foot, two-ton animal was terrible and fluid dripped from it onto the deck. The captain, fearing contamination of his catch, ordered the body dumped back into the ocean. Before that happened, however, Michihiko Yano, an official of the Taiyo Fishery Co., took photographs of the animal and its measurements as well.

The plesiosaurus, a marine reptile, was like a snake with a turtle's body.

**BAJA U/W PHOTO WORKSHOP**

Baja Expeditions, Inc., is offering a unique underwater photo workshop in the Gulf of California, January 15-22, 1978. Informal lectures on both still and motion photography will be given by veteran underwater photographers Marty Snyderman and Howard Hall of the San Diego Diving Locker. Hall was a member of the film crew of *THE DEEP* and has published work in National Geographic, Smithsonian and SKIN DIVER Magazine.

Travel will be aboard a 75 foot fishing boat, *Poseidon*, fully equipped with a scuba air compressor. The number of divers is limited to 18. Basic scuba certification is the minimum requirement. Full cost of \$585 includes: Air flight to La Paz, all boat accommodations, meals and beer, fishing license, bus from San Felipe to San Diego. Tanks, back packs and weight belts are provided. For information write: Baja Expeditions, Inc., Box 3725, San Diego, CA 92103.

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## U/W MARATHON

The world-famous Glenwood Hot Springs Pool in Glenwood Springs, Colorado, was the location for the longest recorded U/W playing of the Parker Brothers game Risk. It lasted from March 3rd to March 9th, over 150 hours, establishing a new world record.

The lust for a world's record brought



photograph by Mark Gamba

dive shop owner, Mike Morelli and a group of 63 area divers together.

The game was made water tight by placing the playing board in a plexiglass-topped steel table. The playing pieces were colored lead as well as the die. The cards were coated with plastic and sheet-metal backed. The table, cards, playing pieces, and three chairs, bracketed for dive tanks, were placed in the 12 foot deep end of the Hot Springs pool.

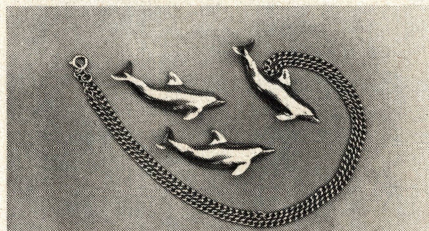
The nonstop playing of the game involved five people at all times. It was played with three people around the table, one person watching air pressure, who was known as the "safety diver," and one "shoretender" to fill tanks and such. These five positions were filled with new people every two hours. A total of 43 games were completed and a running tally was kept on which of the three teams was winning.

The highlight of the event was its ending on March 9th. The last two-hour shifts passed slowly and finally the board came on to the surface after 150 hours of continual play.

## SAVE THE DOLPHINS

In an attempt to reduce porpoise mortalities during tuna fishing, the Save the Dolphins organization is creating dolphin decoys.

For unknown reasons, tuna swim under herds of dolphins and the dolphins are killed when they are caught up in the nets of tuna fishermen. Tuna,



however, are often found under other floating objects. With help from local marine biologists, a dolphin look-alike has been designed. Several score of these fiberglass dolphins will be dragged behind a research vessel to see if tuna will follow them.

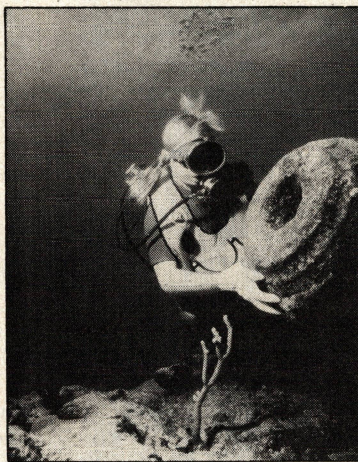
The one thing that the Save the Dolphins organization lacks is money. It is selling dolphin pins and pendants, the proceeds of which will be used for the decoy project. The nickel-plated pins are \$5.50; the pendants, on a stainless steel chain, are \$6.50. These can be ordered from Save the Dolphins, 1945 20th Ave., San Francisco, Calif. 94116.

## EXCLUSIVE MEXICAN SPORTSWAYS DISTRIBUTOR

Sportsways has announced the appointment of a new exclusive distributor for all of Mexico: Tridente Activades Subacuaticas, Blvd. -A- Camacho, Veracruz, Ver. Mexico.

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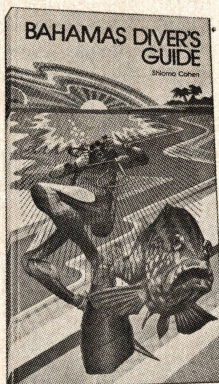
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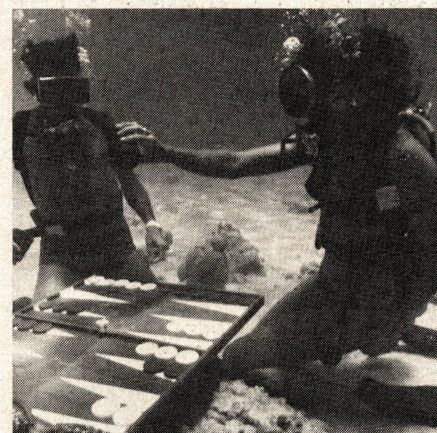
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## DEEP BACKGAMMON

BY BARON VERNON BALL

**B**ackgammon is the oldest game in recorded history. Its tremendous popularity is attributed to the invention of the doubling cube by an unknown American in the early twenties, which appeals to the gambling instincts inherent in 80 percent of all Americans. It's easy to learn and is enjoyed by both sexes of all ages. Entire families play, with the victors selecting the TV programs while the vanquished do the dinner dishes.

Backgammon clubs have sprung up



in nearly every city and town across the states. It's the newest "boy meets girl, girl beats boy" craze in the backgammon discos; and the game can be played anywhere it's flat enough to set up the board. Here is a story to prove my point, which I have entitled Deep Backgammon.

"ABC-TV's Good Morning America's Geraldo Rivera will be in St. Thomas, Virgin Islands, for three days to film an interview with you, the World Backgammon Champion, to air nationally on his show," said Bill Turk, my PR man from Chicago. I was overjoyed at the opportunity to publicize backgammon on his show to over 6,000,000 Rivera fans (and a good story for my McNaught newspaper syndicate column, "The Baron on Backgammon," scheduled for release in the Fall). Bill went on, "Rivera saw the press release I sent out where you said that 'the game can be enjoyed anywhere by anyone, at any time.' Well, here's Catch-22. He wants to play it with you underwater, on a reef, with scuba gear. I told him no problem, you could arrange underwater camera men and a team of divers.

I quickly called Armando Jenik, a great diver and underwater photographer. Filming an underwater



backgammon match should be a piece of cake to Armando, who had just returned from vacation off the coast of Argentina, filming and riding whales.

I had watched Geraldo on his Good Night America show several times in the past, but TV personalities all have the annoying habit of looking completely different off camera, and I wasn't sure I would recognize him.

I was forewarned that Geraldo had a heavy schedule to meet after finishing our shoot and he couldn't afford to get far behind.

With that in mind I arrived at Harry Truman Airport an hour ahead of his scheduled arrival to find a group struggling with a small mountain of suitcases, boxes and assorted gear. On top of the mountain sat a skinny version of Tony Orlando, wearing a bright green shirt with red flowers and faded jeans. I walked up and introduced myself, certain that it was Rivera, because only he could dress like that and get away with it. "It looks like you've come to do a remake of *Jaws*," I said, as I surveyed the pile of gear. "Where's the 30 foot mechanical great white shark?" He replied, "The studio wouldn't loan it to me, but I got this giant rubber duck." As we drove back to the hotel, I thought, "I like this guy. The next couple of days should be a real blast!" Over dinner that evening, Geraldo got down to the business at hand. "Look,

Vern," he said, "My early morning show has to be light, fast, different and entertaining, so if you and I just sat down at a backgammon table and pushed checkers around, we would also push everyone watching right back in bed. That's why I want to do the world's first televised underwater backgammon match." I said, "Great, do you scuba dive?" He said, "No! But I'll learn tomorrow and we'll shoot the next day."

"Geraldo, I don't want to put a damper on things, but we're going to shoot this in over 20 feet of water, offshore where the big reefs are and the visibility's good and you just don't learn to scuba dive in a day." He replied, with authority, "I learned to use my mind to overcome stage fright and I know I can learn to scuba in a day." My book on backgammon and mind control, *Alpha Backgammon*, is being published by Pocket Books/Simon & Schuster late this year. It showshow to use mind control to perfect your game, so I knew Geraldo knew what he was talking about. He *could* learn to scuba dive in one day!

Early the next morning I dropped Rivera off at the dive shop at Bolongo Bay, where Armando was going to transform him into an instant frogman. I took the dive boat and went off to locate a nice protected reef with staghorn coral, clear visibility, no sea urchins, and plenty of room for the camera men to maneuver

without stirring up the sand. I found the perfect location for the shooting, and arrived back at the beach in time to spot two snorkels break the water in front of the dock. Geraldo spit out his mouthpiece and said, "Man it's great, I love it," while Armando nodded his head and added, "He learn faster than anybody I teach, take to scuba like fish!" I laughed, "Great! It's you and me baby, send the giant duck home!"

We arrived over the reef I had selected as the sun was directly overhead. Armando went down first to set up the specially made backgammon board and sweep away some sea urchins that had wandered in during the night. In the final briefing on the shoot, we were told by Armando, who was in charge once we were underwater, "Don't stray away from the set during the five minutes I have to surface and reload the camera. There is a safety raft directly above you in case of any problems." We glided down twenty-five feet through the clear blue water and in slow motion took up our positions at the table. What a high—the dice slowly falling past the overhanging coral, fish swimming over the board completely unaware of us, the creaking sound of reef creatures mixed with the escaping air bubbles!

Geraldo was so enthralled in this new undersea world that he went exploring during a film change. We finally found him in a nearby cave trying to capture

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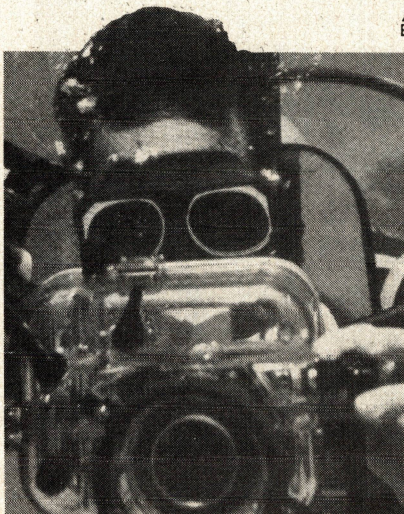
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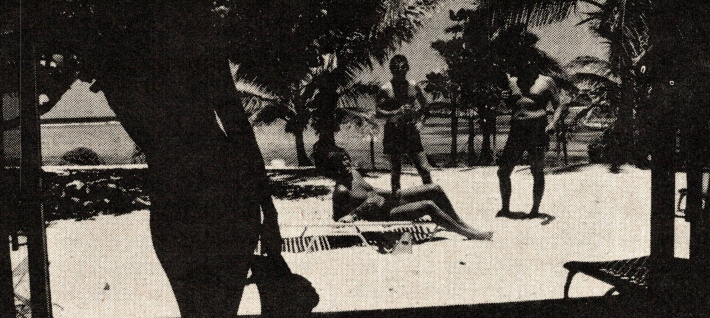
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## DEEP BACKGAMMON

one of our spiny Caribbean lobsters with his bare hands. Armando motioned that he would get it later and for us to get back to the set. The shoot took longer than normal because after every film change we had to scour the various caves and grottos and literally drag Gerardo back on location.

We celebrated that night with a quiet dinner in a thatched gazebo, right on the beach, with lobster and sangria, courtesy of Armando. It was the most relaxed I had seen Gerardo in the three hectic days that I'd known him and he said to me, "I really like it here, it's been great doing this backgammon thing with you, Vern, and I'll be back as soon as I can get some time off. I'm going to read your book and take away your underwater championship."

## FLORIDA TREASURE HUNT

On June 12, 1977, nearly 700 divers participated in an underwater treasure hunt sponsored by Divers Unlimited of Hollywood, Florida. Set to coincide with the world premiere of the motion picture, *THE DEEP*, the treasure hunt involved six months of planning. Dive gear worth over \$1,500, dive trips, T-shirts, and movie passes were some of the prizes.

The *Sunchaser*, Divers Unlimited's 40 foot dive boat, distributed over 200 "treasure discs" along a reef 100 yards off Lloyd State Recreation Area, Dania, Florida. Discs consisted of three-inch washers numbered and tied with bright yellow yarn. Divers were to locate the discs and bring them to shore in exchange for prizes. All but one of the discs were recovered.

## MAHO BAY RESORT

A new camping resort has just opened on St. John, U.S. Virgin Islands. Maho Bay is the home of a unique experiment in vacation living. It is a private community of tent-cottages perched above the most secluded beach in the U.S. Virgin Islands National Park.

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Basic foodstuffs and supplies are sold at the commissary as are beer and wine.

The only organized program is skin and scuba diving. Campers may register in advance for short tuition courses given by two nationally-certified divers. For a nominal cost, tennis players may



use the courts at Caneel Bay Plantation. Power boats, day sailers and jeeps for island touring can be rented in the town of Cruz Bay.

Rates are \$150 per week per site. The minimum stay is one week. Each dwell-



ing is limited to two adults. Each accompanying child will be charged \$35 per week. The charge for each additional day is \$25 plus \$5 a day for each child. A \$30 deposit is required at check-in.

For further information please contact: Stanley Selengut, President, Maho Bay Camps Inc., 17 East 73rd Street, New York, New York 10021.

## SEA TRAIL MOTEL, FLORIDA

The proprietors of the Sea Trail Motel in Key Largo, Florida, offer reef trips geared to the experienced and novice diver as well as snorkeling, photography and scuba courses.

In order to give divers individualized attention, the Sea Trail's 29 foot boat, *F-Stop*, carries a maximum of six. Two-tank dives are common, and the *F-Stop* anchors at sites both in and out of scenic Pennekamp Park.

Rental scuba gear is available. All motel rooms contain TV, air conditioning and a refrigerator. For more information regarding motel and reef trip rates contact: George and Eva Wielder, Sea Trail Motel, Route 1, Box 91, Key Largo, Florida 33037.

## IMPOSSIBLE DREAM ON SCHEDULE

SeaVentures International has announced that construction of their new dive ship, *Impossible Dream*, is on schedule. The 75 foot ship, designed with the diver/photographer in mind, features air conditioned quarters, a photo lab, two air compressors, a spacious dining area, five heads and five freshwater showers.

Sailing out of West Palm Beach, Florida, the *Impossible Dream* will be available for charter in January 1978. The ship sleeps 34, plus crew, and will have a 1500 mile cruising range.

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- *The Underwater Wilderness* is a brilliantly crafted work of art... With this book Carl Roessler has distinguished

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- "I know of no other book that so vividly and accurately describes the coral world nor any that so beautifully portrays it in living color."—Dr. Gilbert L. Voss, Professor of Biological Oceanography, Rosenstiel School of Marine and Atmospheric Science, University of Miami

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# Diver's Directory



Advertising rate is \$55 for three consecutive ads, \$90 for six consecutive ads, \$140 for a full year. **PAYMENT MUST ACCOMPANY COPY.** Send all material to Diver's Directory, c/o Skin Diver, 8490 Sunset Blvd., Los Angeles, Calif. 90069.

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Instr. - Custom Suits - Tours - Metal Detectors

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Mich. 48627 Equipment - Rentals -  
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DIVER'S VILLAGE, INC. (314) 365-3242  
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Hydro - Trips - Salvage - Commercial Work

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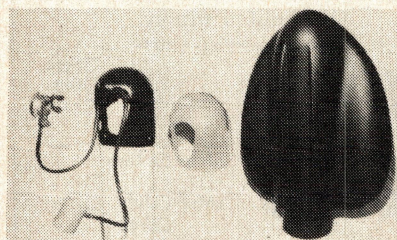
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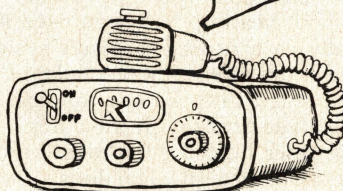


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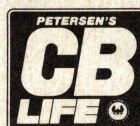
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# Technifacts

(continued from page 36)

operation. The cooling water from the engine, heated through operation to about 180° F, was piped to and through the diver's suit by a suitable hose. Since the diver used an air hose from a surface air supply, the extra water hose added little resistance to the movement of the diver. The water temperature was lowered to tolerable levels as it passed through the hose from the surface of the diver. This type suit has since been designated an open-circuit, hot-water suit.

The hot-water wet suit of today is designed for use with scuba, or with surface air supply rigs. The basic wet suit is very similar to a standard wet suit except that it fits quite loosely. It may be either 3/16" or 1/4" foam neoprene. Usually the suit will be one piece with a front entry zipper. A system of small tubes is cemented under wide strips of tape to the outside of the suit (down the front and back, down the arms, around the waist, and down each leg) to permit an equal distribution of heated water to all parts of the diver's body. A valve is located at the junction of the water supply hose and suit to permit the diver to control the flow of water into the suit.

The hot water supply may be pumped from the surface by separate pumps or from a diving bell or submersible. To maintain adequate body heat, under average conditions conditions of cold water, a flow of about two gallons per minute is required through the suit at a water temperature of 95° to 105° F. Lower ambient water temperatures or longer lengths of hose, will require higher heated water temperature and greater flow rate. A heating-pumping system, similar to those used in swimming pool heating, has been used successfully as a heated wet suit system. The heated water is not recirculated but is discharged into the sea through exhaust valves or through the cuffs.

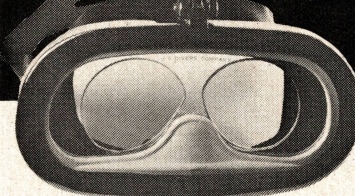
Hot-water heated suits must be of a dependable design. The loose fit required to provide hot water circulation also permits rapid entry of the cold surrounding water and rapid cooling of the diver should the suit or system fail.

Except for material, the closed circuit hot-water suit more closely resembles a conventional dry suit. A special suit of underwear is provided the diver with a system of rubber tubing through which the heated water is pumped. The diver stays dry; the water is pumped back to the source and is reused.

The major disadvantage of this suit is that the tubes in the underwear offer some restrictions to movement.

In both closed and open-circuit hot-water heated suits a disadvantage is the requirement for additional support per-

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In all these methods of keeping the diver warm under extreme low temperature conditions, additional support personnel and support equipment is required. Also, in all systems, care must be taken to ensure that the source of heat is not interrupted because to do so will rapidly expose the diver to cold water conditions with potentially dangerous results. Finally, all of these more sophisticated systems require diver training, special knowledge, and more experience if they are to be used safely to their fullest advantage.

This Technifacts reader is correct in assuming that temperature changes can affect the decompression meter. Radical temperature changes can cause serious error in the instrument. However, the effect is not permanent. Also it is not just the temperature in the carrying case that affects the meter but the temperature of the gas in the meter itself. Finally, it is not the change of temperature from one location to another but, rather, a change in temperature from that that existed when the meter was constructed, calibrated, and sealed to a different temperature.

You can test this theory. Note exactly

Keep in mind that these are extreme changes in temperature. Normal sport diving water temperatures are more likely to range between 60 to 80 degrees and, whatever the water temperature, the meter will very rapidly normalize to ambient water temperature. If the temperature of the water is close to that existing where the meter was constructed, calibrated and tested, there should be no significant error in the meter readings related to temperature. Assume a decompression meter was constructed, calibrated, and sealed in a shop where the temperature was 80° F and is at that time exact in its indication of decompression requirements. The only temperature at which that particular meter will be exactly correct is 80° F. On the other hand, if the meter was assembled in a sweat shop where the temperature was around 90° F and then used in water having a temperature of 40° F, the diver might develop decom-

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# Technifacts

pression problems because of the induced low readings if he relied solely on the decom meter for his decompression.

Probably the ideal temperature for the manufacture of the decompression meter would be about 70° F. Most sport diving is done in waters having temperatures ranging between 60 and 80 degrees. This represents a change of only ten degrees on either side of the manufactured temperature and an induced error of only five percent.

A change in meter readings with a change in temperature is only one of the minor shortcomings of a decom meter and further substantiates the policy of experienced divers: Use a meter always, but only as a guide and a check against your computed decompression schedule.

Regarding the first question asked by the Technifacts reader, "Does this theory upset the intent for which the shipping case was built?"

Absolutely not. The transportation and storage case should be used at all times for transportation of the meter. Normally the greatest change of temperature encountered might change the gas pressure and the meter reading by 15 percent at most and will not cause damage to the meter. Air shipment of the meter without the sealed storage case might expose the meter to pressure changes of as much as 75 percent and could damage the meter.

## OHIO U/W PHOTO CONTEST

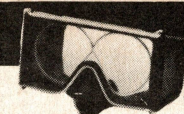
The Ohio Council of Skin and Scuba Divers will sponsor a national U/W photography contest this December. Entry categories include saltwater and freshwater prints and slides and B/W prints. Four prints or slides in any category constitute an entry. More than one entry may be made, but each must be accompanied by an entry fee. Prints should be mounted on an 11 x 14" board. Do not send glass frames.

Entries must be post-marked no later than December 16 and must include entry fee (\$5 for non-council members, \$3 for members) and funds to cover return postage and postal insurance. Send all entries to the Ohio Council Photography Contest, P.O. Box 572, Delaware, Ohio 43015.

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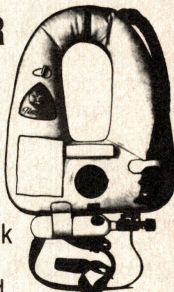
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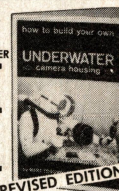
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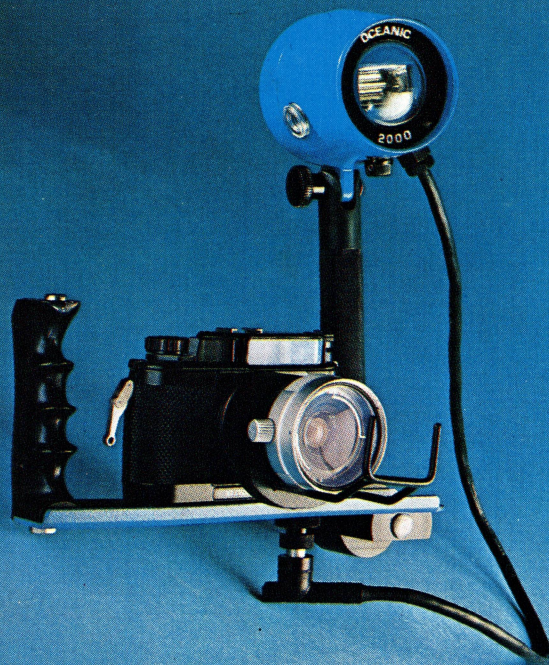
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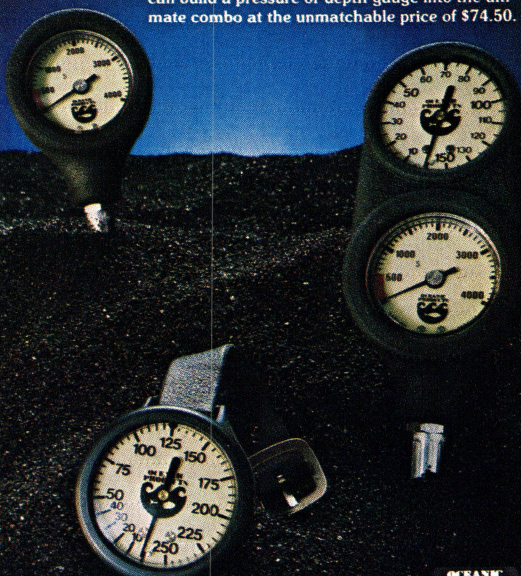


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